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# The American Exporter

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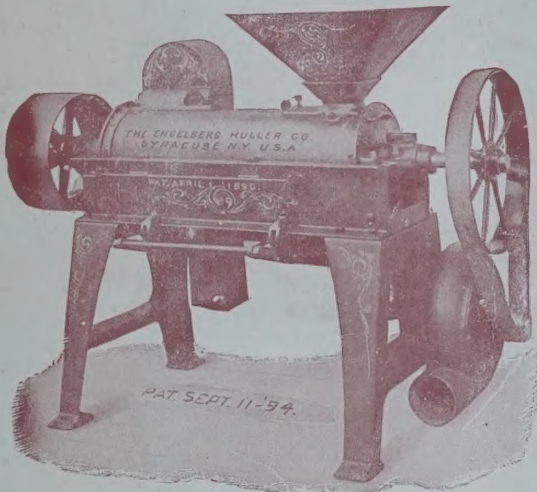
WITH WHICH IS INCORPORATED  
The American Mail and Export Journal.

VOL. XLI.

NEW YORK, DECEMBER, 1897.

No. 1.

## Rice and Coffee Hulling Machinery



LATEST ENGELBERG COFFEE HULLER.



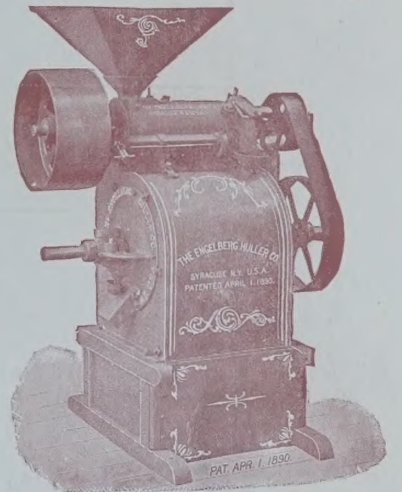
### Our Coffee Huller

Will hull pulped or cherry coffee without breaking or leaving unhulled a single grain. The products will come out clean, polished and free from hulls, ready for bagging, all in one operation. It is **the only** machine that will grind the hulls fine, so that they may be sucked by the blower through the screen underneath the machine, leaving every grain of coffee inside of the machine, no matter how small it may be.

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Is **the only** machine that will take rough rice and in one operation make it merchantable. For simplicity, durability and economy has no equal. They are used on plantations, and also in the largest mills. Both the Coffee and Rice Hullers are made of iron and steel, and can be knocked down and packed for mule transportation if desired.

Send for Circular of our New Machines, with Prices and all information.



IMPROVED RICE HULLER AND POLISHER.

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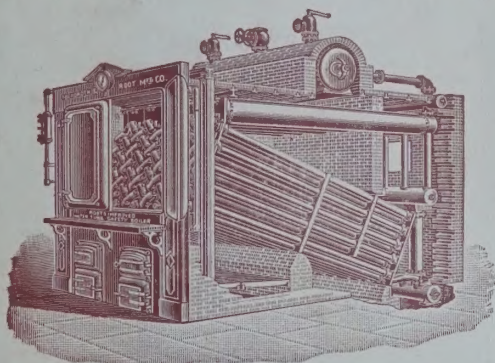
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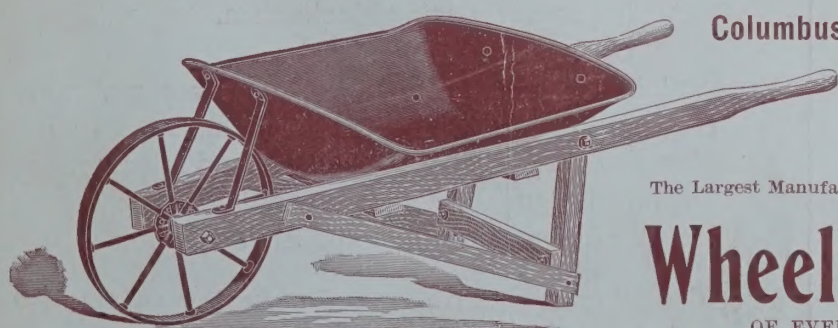
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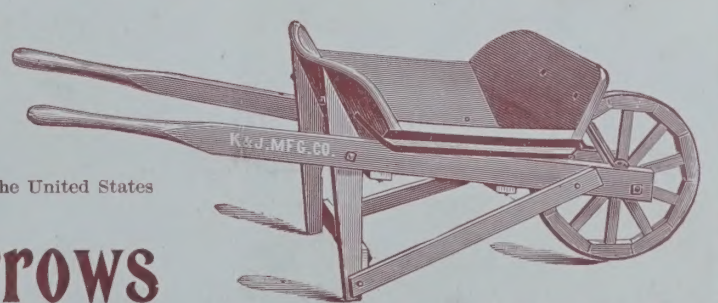
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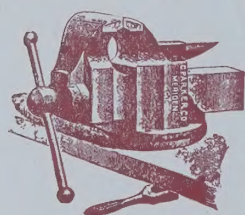
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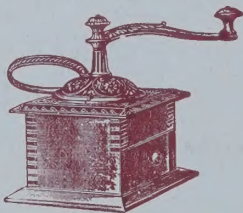
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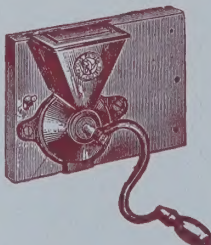
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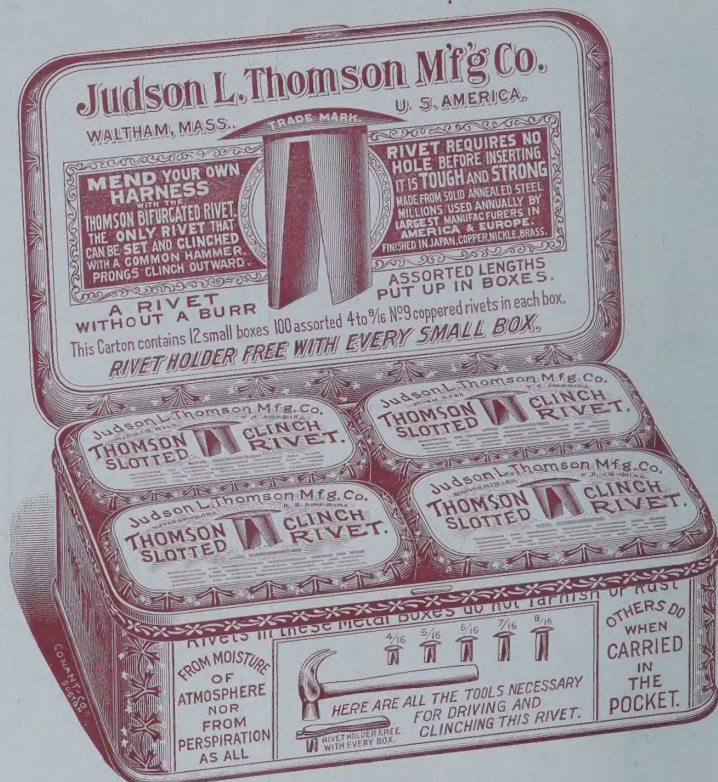
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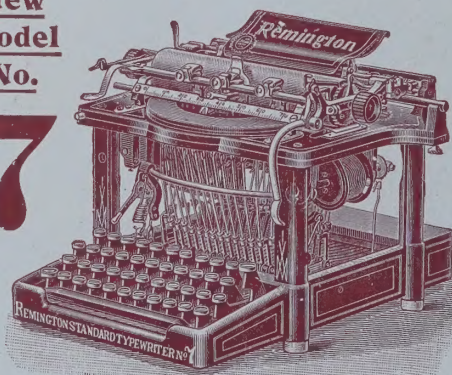
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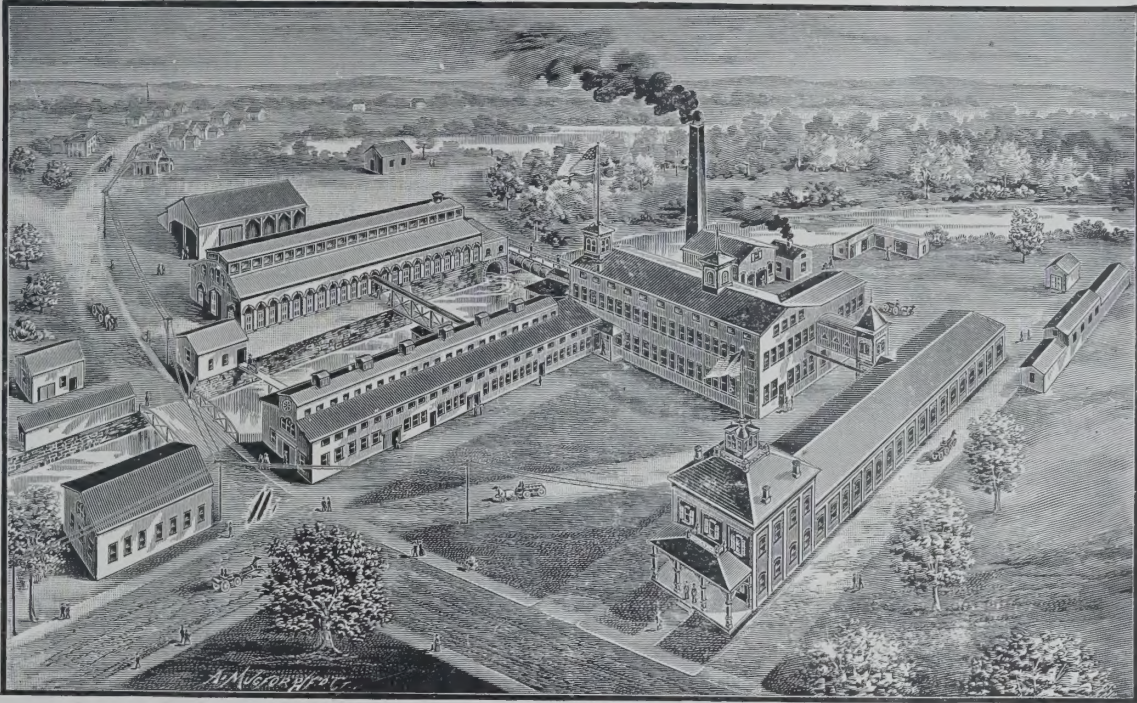
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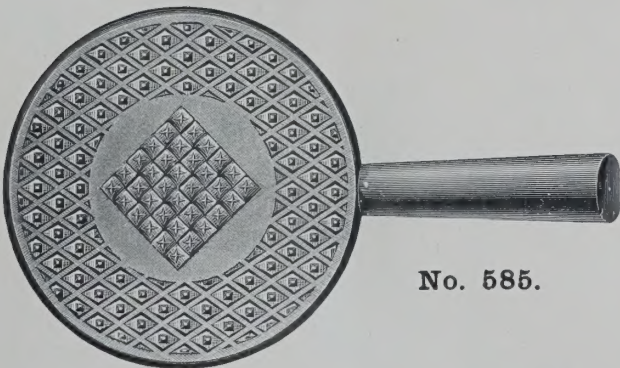
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MANUFACTURERS OF

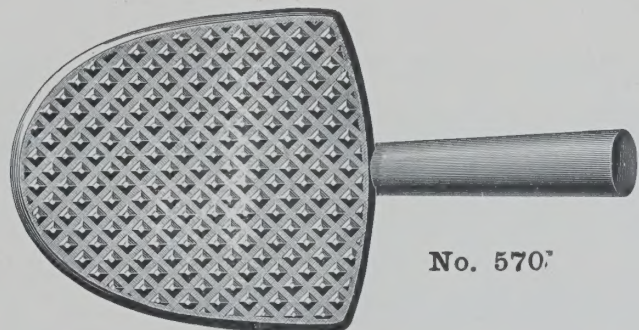
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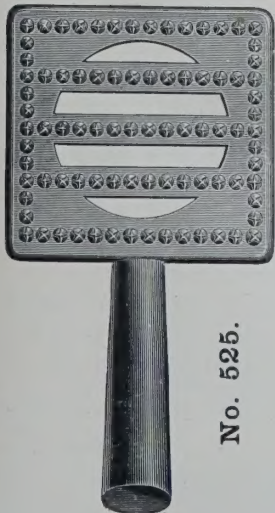
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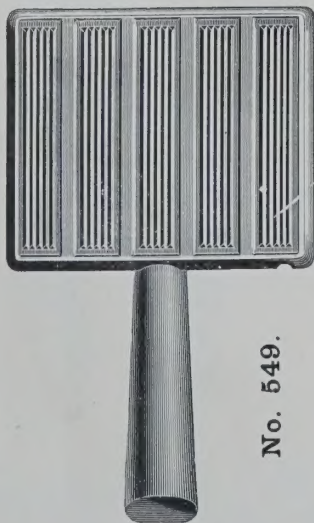
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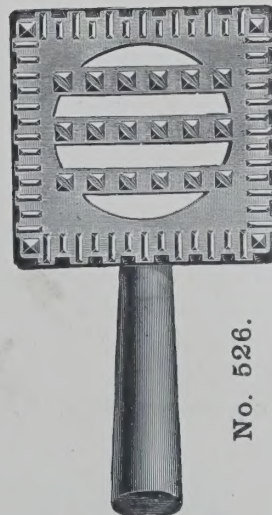
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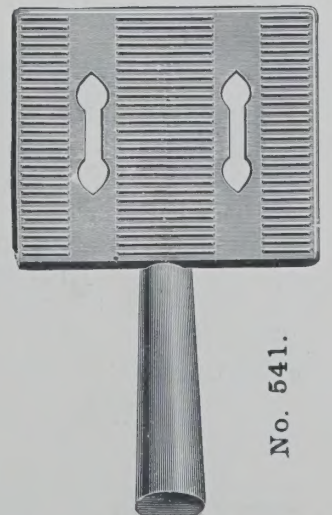
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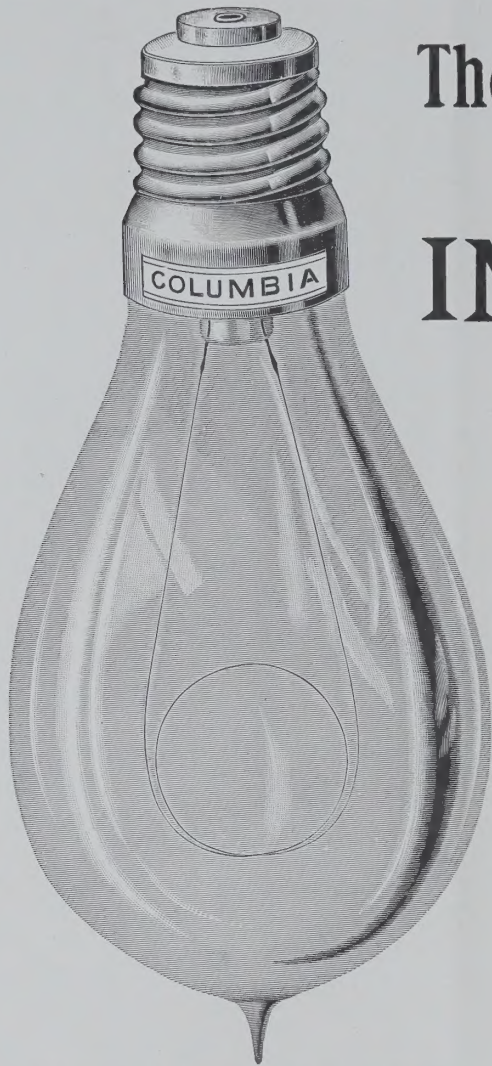
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The above cut shows exact size of our regular Standard Lamp.

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We manufacture in all voltages ranging from 45 to 145 and from 200 to 250 volts.

Write direct to factory for catalogue, price list and other information.

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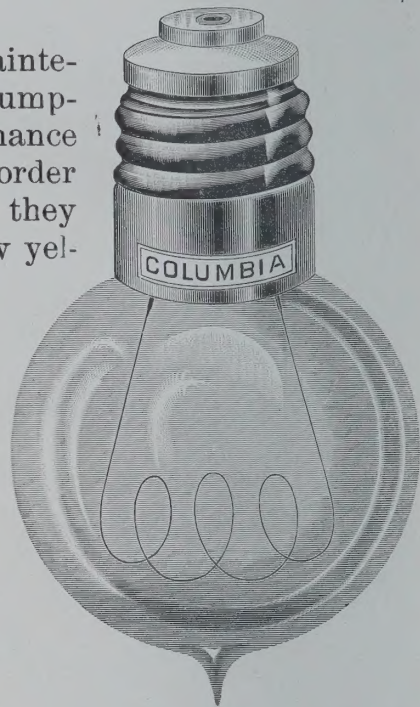
THE COLUMBIA INCANDESCENT LAMP CO.

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SAN FRANCISCO:

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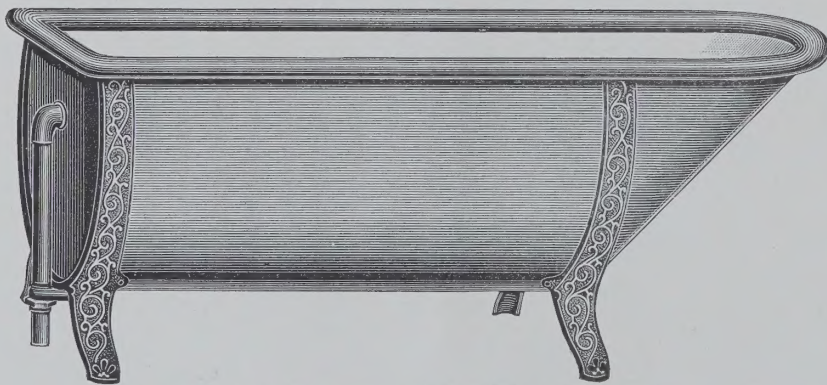


The above cut shows exact size of our round Bulb Lamp for decorative lighting.

In correspondence with us relative to prices please state the candle power and voltage of lamps desired and the style of socket they are intended to fit.

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WHITE ENAMELED.



Price List of our new GALVANIZED STEEL Bath.

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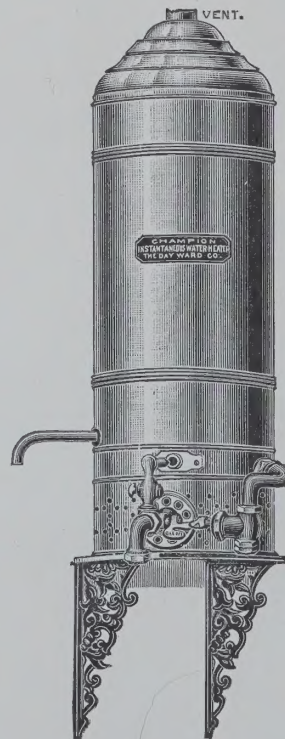
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This Bath is made to meet the demand for a cheap, sanitary Tub, and is of GALVANIZED STEEL, IRON LEGS, and covered inside with four coats WHITE ENAMEL, BAKED ON, giving a good finish.

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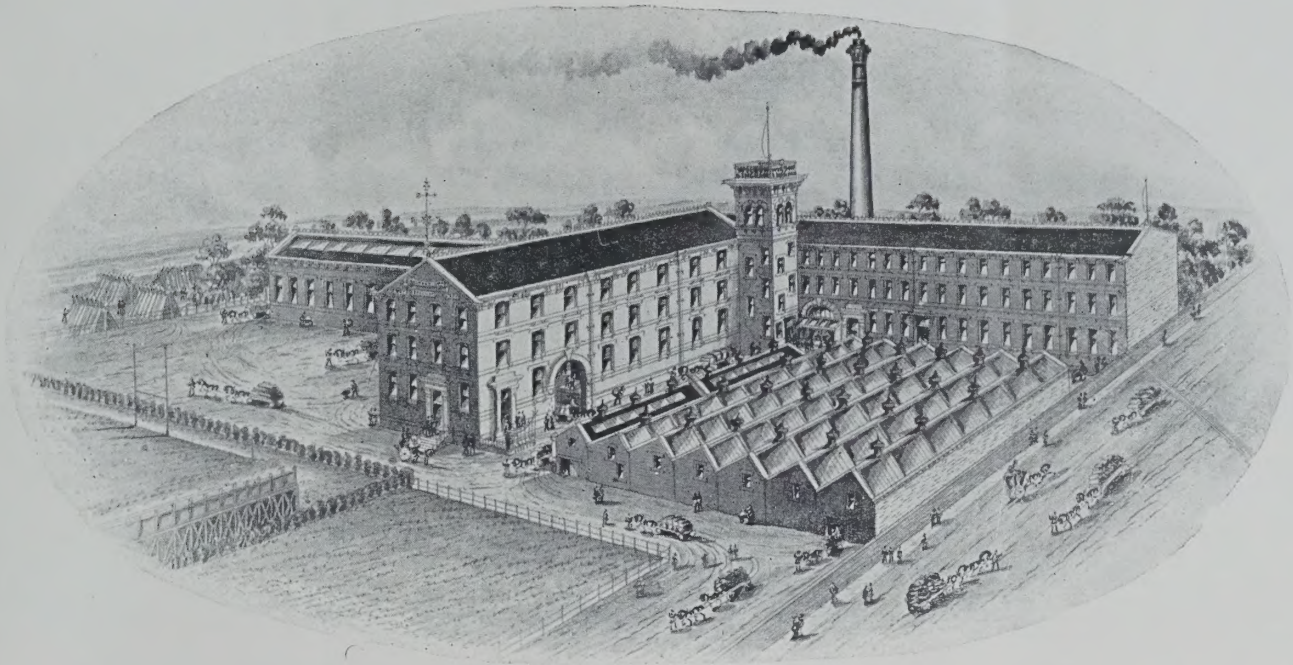


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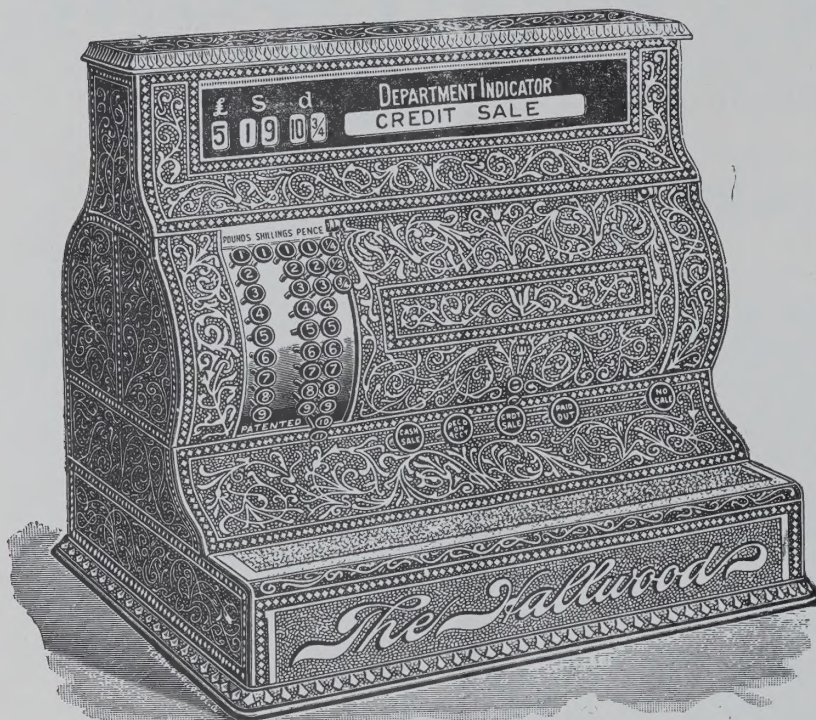
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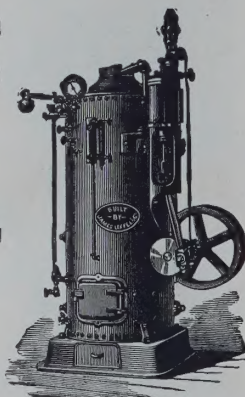
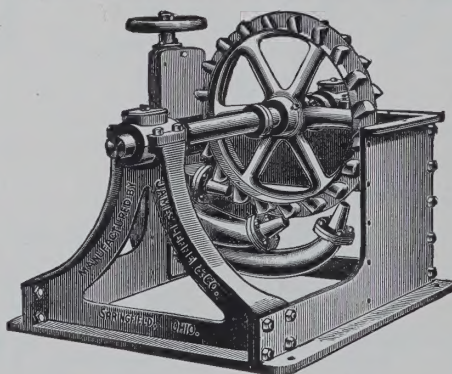
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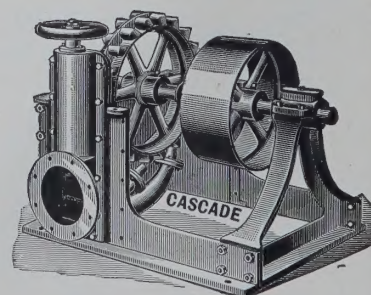
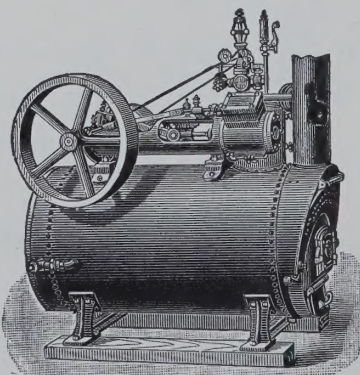
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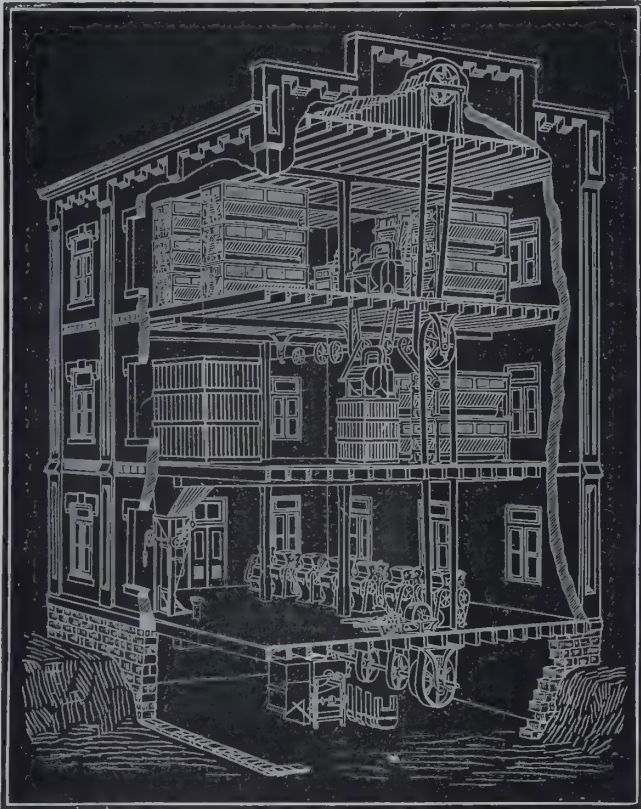
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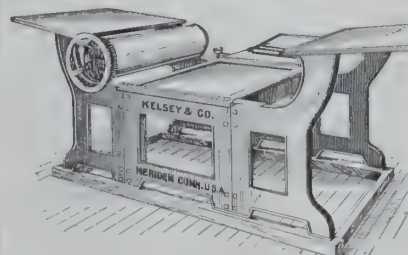
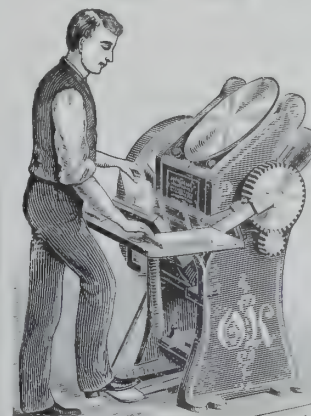
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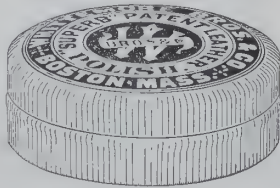


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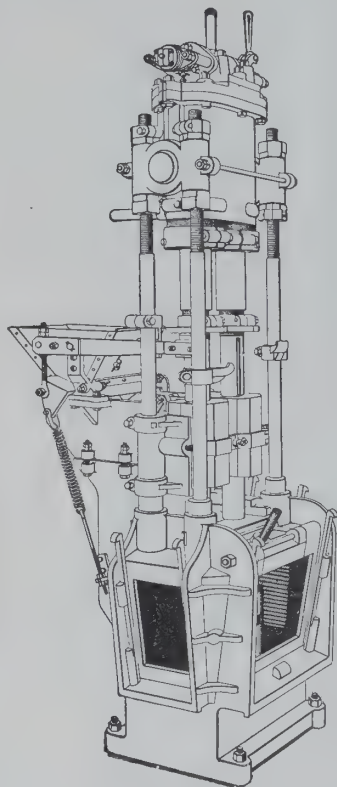
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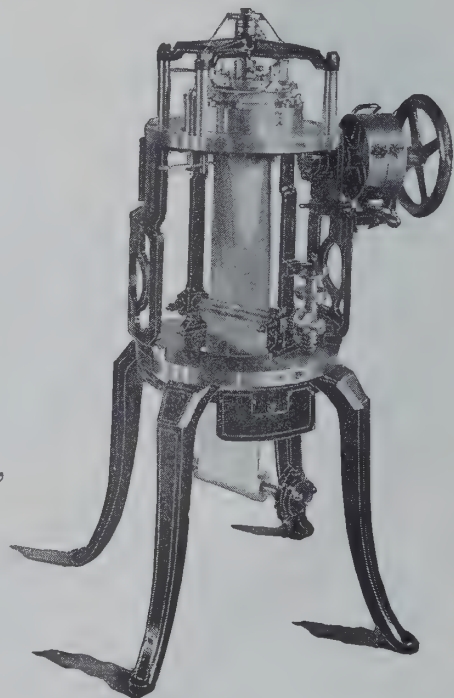
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# THE AMERICAN EXPORTER

(Founded by Root &amp; Tinker, 1877),

AND

THE AMERICAN MAIL AND EXPORT JOURNAL

(Founded by Howard Lockwood &amp; Co., 1877).

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## INDUSTRIAL PROMISES.

A GLANCE at the business situation shows a condition of affairs that is most satisfactory. There has been a marked improvement in all lines of home industries, and this has been followed up by a decided increase in our export trade from month to month throughout the year, but especially during the latter half. Just at present there is noticeable a seasonable abatement, but the promises for 1893 are of the most stable and pleasing character, and altogether the year now closing has been a record breaker.

It is noticeable that all industries are not only increasingly active, but there is a strong tone throughout, which is only present when prosperity is an assured fact. In many factories, furnaces and mills there has been a voluntary increase of wages. Mills and foundries that a year ago were idle have taken on new life and are now in full blast. New enterprises are being started on all sides, and this productive activity foretells a very permanent improvement.

Such industrial prosperity at home presages far more now than it was wont to. That which is equally responsible with healthy home influences for this condition is our splendid trade in all the markets of the world. The foreign demand for our wares is no longer such as may readily be satisfied with the overflow from goods manufactured for home consumption. The demands from all parts of the world are now of such magnitude that much of the improvement in trade that is apparent may be traced directly to the large orders from abroad. It is estimated that the excess of exports over imports for the four months ending with November will be in round numbers \$225,000,000.

A new line of steamships is to ply between New York and India, and the first vessel will carry 1,700 tons of steel rails to Calcutta; 2,000 tons will be sent to Australia, 6,000 tons to Mexico, while Japan has placed orders for more than 20,000 tons. These are an excellent indication that foreign buyers have begun to rely largely upon the United States for manufactured steel products. This trade in rails, it must be remembered, has only been developed within the past year. We are better able now than ever before to meet the demand for steel rails, rolling stock, and in fact for every form of railroad equipment and supplies. The difference in freight rates, which is often adverse, has in most cases been of too little moment to turn the scale against us.

American laundry machinery, we learn, is meeting with much

favor abroad. European importers have been familiar with its good qualities for some time, but South African, South American, and even far away Australian buyers have only recently learned of all we have to offer in the way of mangles and other machines, for both hand and steam power, and we can assure them that when they come to us for anything in the way of laundry machinery they will secure a line of goods equal to any made in all the world. That is, they will if they only insist upon having the best. It is poor policy for an importer to handle any low grade of goods, but more especially is this true of laundry machines.

Mexico sends to us for steel viaducts. Australasia is making constant demands not only for our machinery, agricultural implements, etc., but noticeably for small hardware; while for tools, such as hammers, braces, axes, hatchets, saws, and every variety of carpenters' tools, there is a brisk call. The demand for electrical machinery and apparatus of all kinds continues to grow rapidly. In less than a year there has been a gain of 32 per cent. over the preceding twelvemonth.

There is a very valid reason for our acquisition of a large share of the world's trade in electrical goods. While other nations are unquestionably as deeply involved in electrical research, nevertheless we have readily surpassed them in the early and practical application of every new discovery. The variety, and the high degree of excellence of our electrical manufactures are well worthy the study of foreigners. We would commend this matter to the careful attention of such of our readers as are interested in this particular subject.

As to bicycles, bicycle parts and accessories we have so well demonstrated the superior quality of our goods that there is but little doubt that we must enjoy a most satisfactory volume of business for the ensuing year.

Export trade in shoes and shoe-making machinery, in agricultural implements, and in all classes of wood and metal working machinery, is creeping steadily into every distant corner of the globe, and it is pleasant to forecast the industrial promises of the future from the position we now hold, and from the enduring reputation we have established.

## SERIOUS COMPETITION.

THE President of the London Board of Trade, Mr. Chas. T. Ritchie, in a recent speech, made some remarks bearing upon the trade relations of England with the United States that are of weighty import.

"America's successful competition," he says, "is due to her enterprise in embarking capital, but it is yet more due to the freedom her manufacturers enjoy of employing the best machinery and working it in the most economical manner. \* \* \*

"The facts are serious," he continued, "and call upon us for the exercise of all our powers to enable us to maintain our position in the commercial world. There is no doubt that the United States are executing orders which ought to be executed here. As we all know, an American firm obtained the contract for the Central Underground Railway (of London), as its bid was lower than those of the English concerns, and it could deliver the supplies three months ahead of the British tenders. Many important Continental orders have gone to America. The same is to be said of Egypt and Japan, where the Americans are doing work that Englishmen should have done."

We can understand somewhat Mr. Ritchie's chagrin at the thought that we are becoming rivals for the trade in the "right little, tight little" isle, and that we are able to compete so successfully with the English manufacturer, but we do not see that the neutral markets of Egypt and Japan should be supplied solely by the British manufacturer.

Still, it is refreshing to get a statement of such significance from so eminent an authority. We are aware that our products have met with a considerable degree of success in English markets, but we have not very often received either praise or mention of our wares, our only, but after all best, evidence of foreign apprecia-



tion being the tacit acknowledgment that our goods were bought on their merit and that the demand was increasing.

Yet it seems to us that Mr. Ritchie's statement that we are ousting British trade is hardly true literally. Our exports have been unprecedentedly large, but it must be admitted that we have become a formidable rival in the world's commerce simply because we are creating and filling many new wants. There are many causes which arise to operate, as is seen in the present case, to the apparent success of one nation and the detriment of another. It is a condition of affairs that will right itself naturally, with the result that a more equable and healthy distribution of the competition between all countries will follow.

We are successful because of the activity and progressiveness of our manufacturers in every line of industry. Other nations wish to keep in the vanguard of material advancement, but those whose office it should be to bring it about—the manufacturers—are too conservative to strike out and either originate or imitate advanced methods. To offset this tendency to stand still there is an important element in all countries, representing capital and the more progressive spirit of the day, and it is to these, the foreign importers, that our success is largely attributable. They see and understand the needs of their own people, and they seek and find that source to supply their wants where they can best serve their own ends.

Our railroad cars are now being used in England, and the fact is announced to the English public by the English managers with a great deal of self praise for the innovation. Now, such is the intrinsic superiority of our cars over the old-fashioned Continental carriages that there is but little question as to how they will be received. Have these cars been ordered because our goods are better than could have been made in England? No. But it is incontrovertible that they are better and more convenient than the cars that they have been making in England. That's the whole situation in a nutshell.

There are two important methods which dominate business nowadays. One is to give the people what they don't want and make it go by sheer force, the other is to give the people what they do want and cheerfully receive either as a necessity or luxury. It needs no argument to show that the latter method is the key to success.

### AMERICAN IRON PIPE.

IT was probably a surprise to the Town Council of Glasgow to learn that American cast-iron pipe could be delivered in their city for £1 per ton less than local dealers cared to supply it. The methods of iron founding in this country have been vastly improved and cheapened within the past twenty years, and especially in pipe manufacture have there been numerous improvements. Cores are better made and far more easily handled and cupolas are built with greater capacity. The cost of steam power has been reduced by improved coal-handling machinery and by means of mechanical stokers for the furnaces. These improvements are now so perfect that hand labor is scarcely required from the time the coal leaves the mine until the ashes are conveyed to the dump. This is one reason why many American foundries can turn out castings at a cost of a cent a pound. In the matter of wrought-iron pipe, so many new welding machines have come on the market within a few years, introducing new ways of spiral, butt and lap welding, with application of the heat exactly at the desired points, that the large sizes of wrought pipe may now be made almost as cheaply as the smaller sizes.

The trades unions here interfere less with manufacturing industries than on the other side of the Atlantic. We never hear of employees tying up machinery because they cannot agree as to what class certain repairs belong. The American workman seldom strikes or interferes with his employer's business except on a question of wages.

In American pipe mills and foundries the workmen are divided into two classes—a few high-priced men who furnish the brains and the mechanical knowledge for the successful operation of the plant,

and a number of unskilled laborers, who do the routine work or attend to the automatic machinery. There are but very few who come between the two classes, and as it is against the interest of the well-paid men to do anything that would increase cost of manufacture they can be counted on to work for the general prosperity of the trade. The low-priced labor requires so little skill that it is almost useless for men of this class to attempt to try to tie up an establishment, because they are too easily replaced. It is only in certain industries where a large number of evenly skilled men are employed at the same rate of pay that there is always a threatened danger from labor troubles.

There are many other articles besides iron pipe and others which figure frequently on the export list which could be advantageously supplied to foreign consumers did they take the trouble to inform themselves, as did the Council of Glasgow, of the progress of certain industries in this country.

### TRADE CONQUESTS.

ONE has long been accustomed to picture China and Japan as enormous empires packed with fabulous populations that even in the swift commercial progress of the end of this century remained in a dark age of ignorance in so far as trade with the world at large was concerned. It was the aggressive policy of Great Britain which practically forced upon the benighted Orientals an acquaintance with her products.

But the war which terminated last year, in the humiliation of China, bore for that country a lesson of wider knowledge, and while Japan remains conqueror, she is astute enough to perceive that while to the victor belong the spoils, there must be a concomitant power to maintain its possessions. Both countries realize that such power lies in trade influence. The bolder and more modern nations are discerning their trend and have set eyes of desire upon the possibilities they offer.

Trade to-day is the mainspring of all policies, individual and governmental. Germany's martial seizure of Kiao Chou Bay is no mere reprisal for the murder of two missionaries by Chinese fanatics. The opinion of experience is that the battlefield of the present among highly civilized nations is in the cabinet of diplomats. Land or water is no longer controlled for a mere purpose of tenancy, but to reap the best trade results available from the occupation of that land or sea.

The United States, with no desire for territorial acquisition, has been pursuing the peaceful but all-powerful course of trade conquest in China and Japan. American rails, cars and locomotives make the three railroad systems of China. They are in their infancy as yet and their undeniably profitable future must naturally be intrusted to those who have thus far constructed them so successfully. To properly recognize the influence of a railroad in a country's development one has only to remember the growth of our own Far West since the first railway train crossed this continent. The exports of machinery, nevertheless, have thus far been small in comparison with our wheat and flour trade in that region. During 1896 70,000,000 pounds of flour were shipped to China. These figures witness a more than double increase within five years. From Japan the reports are still more encouraging. Although they do not eat bread in Japan, they use immense quantities of flour for confections and pastry, which are staple articles of diet with them. During 1896 Japan took something like 31 401,314 pounds of flour. These imports it will be remembered were taken while both countries were in the throes of a most ravaging and violent war.

The Chinese, however, are a people of great thrift. They were quick to discover that a great saving might be made in the growing of wheat in their own broad fields and in the milling of it there. Until now they have produced but a very inferior quality of wheat, and their means of manufacture are of the most primitive character. No matter in what way China develops, however, we must profit by it, and she has got to turn to us for agricultural and mechanical appliances. If China will take up with agricultural pursuits there must arise a splendid opportunity for our superior



inventions for the harvesting and marketing of all such products. The comparative propinquity of the Orient to the Pacific Slope allows of direct and prompt shipments, an advantage which has told in our competition with the world for the rich bounty of trade.

A timely advance bid for the disposal of our mechanical treasures is evident in the promotion of the American-Chinese Chamber of Commerce about to be founded at Shanghai. It is the project of merchants in New York, Chicago, Philadelphia and San Francisco. The scheme is planned upon a most sound monetary basis, and a wealth of experience, comprehension and enterprise is there to corroborate the investment. A building on the usual lines of architecture adopted for board of trade or chamber of commerce building is to be constructed at a cost of \$200,000. In it will be held a permanent exhibition of our latest and most approved electrical and mechanical apparatus and appliances most suitable for the needs of the country, together with a miscellaneous exhibit of general products and materials. American business men will be on the spot to supervise their respective displays so that naught can be lacking to assure an advance of commercial influence in the fertile lands of the Orient.

### REPEAL THE WINTER LOAD LINES.

WHEN, some four years ago, a change was made in the load-line regulations governing vessels sailing from American ports, the effect was, as is well known, to divide our seaboard ports at the Chesapeake entrance to the Atlantic, giving to the ports north of that line a much reduced Winter freeboard, and allowing that from the ports south of that point to remain practically the same throughout the year. This at once gave to Norfolk, Newport News and Baltimore advantages over Northern ports which were calculated to be, most unjustly so, detrimental to the Winter trade of the latter. Naturally, this discrimination, known as the "North Atlantic Winter load line," has proved very injurious to the shipping trade from such ports as New York, Philadelphia, Boston and Portland. By this restrictive measure vessels of equal capacity have been able to carry almost twice as much from the favored Southern ports as from the North. The difference in the space on the sides of the vessels between "W. N. A.," the restrictive load line, and "W.," the ordinary Winter line, is almost double that between the Winter and Summer lines. This gives so much more freeboard and so much less loading capacity, that vessels from Northern ports find that their earning capacity is reduced from \$1,000 to \$1,500 per steamer during the enforcement of the Winter load line.

This, however, is not the most serious effect of this restrictive measure, though it is an important one. But an equally sound argument for the repeal of it is, that it is manifestly unjust and harmful, because it diverts the volume of trade from the larger ports, where it can be handled with every facility, and from which oft-times most direct shipments may be made, to Southern ports, which are admittedly unable to handle the increased trade as also are the railroads connecting therewith, and the inevitable result is a delay in shipments during the Winter months, which must work incalculable harm to our commerce, as well as serious injury to the importers, who also must find their business suffer from delayed orders.

It is to the North Atlantic ports that there is the most efficient railway service, and there is never the slightest likelihood that the traffic will become congested for an indefinite time as is now the case on the Southern roads which try to carry the immense quantities of freight which naturally enough flow to the Southern ports. There should be an absolute uniformity of the load-line regulations from all ports in Winter and in Summer. That this is a most tenable position to take is readily demonstrated. At the time the change was made it was ostensibly to protect life and property at sea, the supposition being that the North Atlantic was more dangerous from October to March. But this has been proved to be the veriest bosh. As a matter of fact, whether vessels sail from Northern or Southern ports they all get into the same well-beaten track across the

Atlantic as soon as they are well out of port. If any further argument were needed to illustrate the injustice of the Winter load-line discrimination, that offered by the insurance companies is certainly a clincher. They do not make any difference in rates and hence consider there is no greater danger. They put the vessels all on an equal footing.

In a memorial drawn up by the insurance companies and presented to the Glasgow Board of Trade they say: "So far as underwriting interests are concerned the companies do not consider that the risks in the North Atlantic in the Winter encountered by vessels trading between New York, Philadelphia and Boston are at all greater than those to vessels trading with Baltimore, Newport News and Norfolk."

If the underwriters, whose interests are surely as vital as any concerned, take this view of the matter, there can be nothing said in favor of the maintenance of the present restrictive load line.

To back up the stand of the insurance companies the action taken by commercial organizations and steamship companies here should be the deciding voice in the adjustment of this vexing question. Nine of the leading commercial and maritime organizations of Philadelphia have signed a petition to the Board of Trade requesting the annulment of the present Winter load line. This has been followed by one from 100 of the leading New York merchants and steamship agents. The banking corporations have sent in a protest, and the railroads of the Northern States and Canada have also petitioned for redress. Of equally great import is the petition presented by the influential marine insurance companies of the United States and the American agents of the foreign underwriters. All these documents pray for deliverance from the injustice of this shackle upon our commerce from the Northern ports.

It will not be possible for the Board of Trade to ignore these protests, representing as they do the paramount influence concerned in the matter. Advice will naturally be sought by the Board of Trade of Lloyd's, British Corporation and Bureau Veritas. We think there can be no question as to the decision they will give. There can be but one decision arrived at in the premises and that is the repeal of the Winter load line as it stands at present, and the placing of all vessels on an equality.

### INCREASED SHIPPING DEMANDS.

IF any direct evidence were needed to show the enormous increase in our export trade the new lines of ships and the augmented tonnage of many old lines would bear witness to the fact in striking manner. A fleet of four new steamers has been contracted for, to be finished early next year, to ply between this country and the West Indies. A new Pacific steamship company, in which several Japanese capitalists are interested, and which purposes controlling a fleet of six steamships, is well under way. Several additions have been made to Transatlantic facilities. The Lord line has established this Fall new monthly service between Newport News and Belfast and Dublin, the Phoenix line to Antwerp, the Donaldson line to Glasgow, and the Forenade-Virginia Baltic line to Copenhagen. A new line to Bremen, and additional service of many ships to London, Liverpool and Hamburg, may also be noted.

The increase of our trade with the Orient is shown to be of permanent and extensive character by the establishment last month of a direct steamship service between New York and India. The first sailing was set for November 27th. The vessel is one of 4,000 tons. She goes via Suez Canal, and carries freight for Aden, Persian Gulf, Bombay, Calcutta, Malabar Coast, Ceylon and Madras. The opening of this line is of more than usual interest and significance, since it is the first direct line from New York for these ports. It is intended that this sailing shall be followed by a regular monthly service. The new line has good backing, and is formed with the definite purpose of developing trade with these ports. The managers and agents express great confidence in their new enterprise. It is our opinion that this is a long-headed move and



that the importers of the cities named will avail themselves of the opportunity given to keep in touch with the United States.

A contract has been placed with a Maine shipbuilder for the construction of a tramp steamer, to be finished and ready for business in May, 1898. This is the first of the kind ever built here and she is designed especially for speed and the carrying of freight for foreign service. Upon her success will depend other ventures of the same character. The S.S. Kaiser Wilhelm der Grosse is the latest splendid addition to the ocean racers, and, notwithstanding this recent increase in the available tonnage from this port for Europe, the White Star line has in course of construction and is hurrying the completion of ships that will aggregate 100,000 tonnage.

It is well known that it is a difficult matter to obtain shipment of anything across the Atlantic at present. Speaking with a gentleman who is an authority on the subject, he made the assertion that every available ounce of tonnage now afloat or contracted for is taken right up to next June. We might go on, it seems, almost without end, but this showing is sufficient indication of the prosperous condition of our export trade.

#### A DEFENSE OF THE AMERICAN BICYCLE.

WHEN we read in foreign papers, as we frequently do, some diatribe on the inferior quality of bicycles imported from this country it very naturally and justly arouses our indignation. In the name of common honesty we protest. If it be true that a great many poor-grade wheels are shipped from this country, and we might say frankly enough that we do not doubt the statements in part, why not tell the whole truth about the matter and show wherein lies the evil and the remedy? We can point it out very readily. We have already done so in the past. We will continue to do so again and again until the matter is righted. But there are none so blind as those who will not see, nor so deaf as those who will not hear.

To be sure we have some low-grade wheels made here. It is also true that there are many manufacturers not overscrupulous; there are men with little foresight and less capital who must cater to popular clamor for cheap though inferior goods. Men, too, whose reputation is founded upon sand, and who remain but temporarily in business for the money they can get from it while the boom lasts. For that matter such a state of affairs must necessarily exist among all nations. No one is more wide awake to these facts than the importer himself. He knows where to find the best and the cheapest, the worst and the dearest class of goods; but it is not the British importer who complains of American bicycles; he has no reason to do so, for he has never failed to receive full value for his money. The invectives come from foreign manufacturers through the medium of the press.

We complain bitterly, and we shall continue our protests so long as the injustice continues, against the sweeping condemnation of the American wheel by those who know full well just where to fix the blame. If the American wheel of solid reputation was not a little more than just able to hold its own with those of European make then the large and increasing exportations from the United States to the United Kingdom and elsewhere and the almost total absence of importations might be a difficult problem to solve.

The unjust reproaches in certain quarters of the foreign press is enough to make a sensible man lose patience. They should take a lesson in fair play from the *Kleine Journal*, Berlin, a quotation from which appears in another column. They know it so well that they do not require us to tell them why their merchants purchase American bicycles. They buy because the reputation "American" finds a ready market for them.

But not content with a quick-selling article at a fair profit, a number of jobbers seek to impose upon the English riders with inferior goods sold at standard prices upon the strength of American reputation. If the foreign newspapers were to act fairly and protest, not against the American manufacturer in general, but against those jobbers who seek to deceive the public, the evil would quickly

cease and complaints of American cycles become as rare as figs on mulberry bushes. We can hardly hope for this, for the different foreign journals are the guardians of the interests of their own manufacturers, and these latter must naturally look upon us as poachers upon their preserves. It is certainly more to their interest to decry our trade *in toto* than to seek to open the eyes of the riding public to the sins of some of their own importers. But is it fair? Is it right? Is it just? We rely principally upon the proverbial British spirit of fair play to decide. The remedy we prescribe is very simple, let the rider insist upon an American bicycle made by a reliable and responsible firm and he will never have cause to complain.

#### FOREIGN MARKET FOR AMERICAN WRITING MACHINES.

OBSERVANT Americans have often noticed, when travelling in foreign countries, the comparative rarity of the typewriter in commercial and professional offices. In America it is no uncommon thing for a single office building to contain a hundred or more of these machines. One would hardly find as many in a block or even an entire business street of many European capitals.

This condition of affairs is, we believe, now rapidly passing away and the typewriter is coming to be universally regarded as indispensable. No case is on record of a business man who abandoned the use of one of these machines after once giving it a trial. Indeed, such a thing is hardly conceivable. The invention has practically revolutionized modern office methods. The results are in themselves immeasurably superior, the typewritten page surpassing even the clearest script in legibility, neatness and economy of space. And there is a material saving in the cost of producing these results, both in the time of the employer and in the expense of subordinates. The art of shorthand is almost as old as that of writing itself, but it remained for the introduction of the typewriter to bring it into general use in business offices. Now, instead of laboriously writing himself, the busy merchant or lawyer dictates to a stenographer. Twenty letters are disposed of in the time formerly allotted to one, and after a short time they are typewritten and returned to his desk ready for the signatures. The art of typewriting is very readily acquired, and, as a natural result, the office force required to operate the machines is inexpensive. In American offices young women are almost universally employed in this capacity and have proved themselves especially adapted to the work.

In addition to the excellence of its work and the comparative cheapness with which it is obtained, the typewriter recommends itself to business men on account of the diversity of uses to which it is adapted. As business relations become more complex there is an increasing need of preserving copies of important letters for reference. The typewriter offers several methods of obtaining such copies. The blotter, or book made of paper capable when wet of taking an impression of a letter on which it is pressed, provided the latter be written with copying ink, often renders letters written with pen illegible, but produces admirable copies of typewritten letters. Carbon paper can be so inserted between the sheets so as to produce two, three and sometimes a dozen copies, according to the kind of paper used. Or if the matter requires numerous duplicates, such devices as the mimeograph can be employed, capable of making a hundred or a thousand impressions. Machines are now made in almost every European language, and several American manufacturers offer to supply at a very moderate extra expense machines for writing every modern language, including commercial signs and fractions for accountants. A typewriter capable of writing in books was recently described at length in these columns.

The advantage of the American manufacturer in the production of typewriters is not only marked, but is likely to be permanent. An American invention at the start, the models first in use have been improved again and again, as a result of the keen competition between the manufacturers and of the widely varied uses and tests to which the machines have been put. As in the case of the sewing



machine and the bicycle, perfection in construction has been more and more nearly approached with each succeeding year. A striking proof of this is the fact recently brought out that several of the leading American firms engaged in the manufacture of these machines control from fifty to eighty distinct patents on minor improvements in construction.

All this is distinctly in the interest of the foreign buyer who desires a writing machine and who naturally wants the best. Instead of being a new and untried invention, the machines brought to his attention are the outgrowth of years of practical experience and the survivors of the most thorough tests and the most vigorous competition. Buyers will, therefore, naturally turn to the American models, and it is not impossible that the great success abroad of American sewing machines may be duplicated in a measure by that of the typewriters. In the former case buyers were given the best machines that human ingenuity could devise for the purpose at the lowest cost, and on the most reasonable terms. The manufacturers of writing machines are now offering the same advantages. It remains to be seen whether the response will be as widespread and as generous.

### OUR BOOK LIST.

ON another page will be found a list of books relating to electricity, mining, engineering, machinery and kindred subjects likely to be of interest to our readers. This list has been prepared in the belief that many will welcome it as offering a simple and direct means of securing such works. All who are using or who are thinking of buying American machinery of any description will be interested in standard American books relating to machines of that class. The section on electricity is particularly large, as the interest in this department is very great at the present time in every part of the world.

It is not claimed that the list is authoritative, nor that the books mentioned on any subject are beyond dispute the leading works in that particular field. To attempt this was out of the question. But we believe the works given to be standard and accurate. A complete list of American publications on electricity alone would fill several pages, so no attempt at completeness was possible. Any book not mentioned, however, can be supplied by us, and if books relating to any particular topic are desired we shall be glad to send descriptive circulars and price lists of books of that description, or to forward immediately the best available book on the subject whenever a remittance accompanies the letter of inquiry.

This list is an experiment. If it appears to meet with favor it will be continued and its usefulness enlarged from month to month. It is started not as a money-making feature, but as a means of spreading information regarding American machines and industrial methods, and as a convenience to our readers, particularly those who are so situated that direct communication with American publishers is difficult or impossible. It was for the latter more especially that the brief list of general reference books, chiefly subscription, was added.

MR. ALFRED I. HART writes from Yokohama, Japan, that while stopping at Honolulu on his way out from San Francisco he obtained several good orders for his house in Richmond, Va., before he discovered that he was running the risk of being made to pay a fine of \$500 for not having taken out a license in accordance with the requirements of the government of Hawaii.

It seems that all foreigners visiting Hawaii for business purposes are required to contribute a certain amount for the privilege of doing business in that republic.

IN a new motor vehicle the fluid used in the supply reservoir acts directly upon the driving wheels which constitute a part of the motor by which the vehicle is propelled. The reservoir, located between the driving wheels, carries at each end a dish shaped spider, with tubular valve-controlled arms, provided with extension arms which eject the fluid contained in the reservoir in opposite directions upon a series of blades carried by the wheels, which may be driven in either direction, as desired. The fluid used for charging the supply reservoir may be compressed air or ammonia, or other gas that may be conveniently conducted from a main reservoir to the motor reservoir.

### American Electrical Apparatus Abroad.

IT would be unbecoming for America to forget the debt of gratitude which it owes Europe for many of the great discoveries which have made this century famous. Yet, on the other hand, America has well repaid the debt by the work of its own inventors, who have reduced many of these discoveries to practical applications, and thus enriched the industries of the whole world. It is in no spirit of exultation, therefore, that we express our gratification at the increasing exportation of American electrical apparatus to foreign countries, and more especially to Great Britain and Europe. Thus, hard upon the announcement of a few weeks ago, that the Dublin electric railways had decided to equip with General Electric apparatus, comes the announcement last week that Glasgow had decided to equip its seventy miles of tramways with Westinghouse railway material. In this issue also we describe the electric launch now building for the Czar of Russia at the works of the Electric Launch Company, in New York. In spite of the fact, also, that Germany has made tremendous strides in the manufacture of railway material during the past few years, American apparatus finds a ready market there, while in France, for example, nearly one-half of the twenty-four roads operating electrically at the beginning of this year were using Thomson-Houston equipments.

To Americans who for years have had dinned into their ears the cry that we could not compete with foreign cheap labor this continued demand for America's electrical product abroad is of more than passing moment. Granted, what is undoubtedly the fact, that our labor is dearer than that abroad, the possibility of selling American electrical goods in European markets indicates that there must be other economies or advantages in our methods of manufacture which more than offset the labor account. And no one who has had an opportunity of passing through America's great electrical shops can fail to observe this. The fact is that machine work has been applied to the very smallest detail of dynamo and motor manufacture, and frequently of so automatic a character that a single attendant is capable of taking care of half a dozen machines. The processes have simply been reduced to a maximum of machine work and a minimum of hand labor. Europe is struggling hard against this régime, but looking at the subject from all sides we can see but one outcome to the ordeal. Indeed, the great machinists' strike now on in England is based in part on the protest of the labor unions against the introduction and full utilization of automatic tools. In this connection we might also recall the difficulties experienced by Mr. H. S. Maxim in his gun works owing to the introduction of automatic machinery. We must confess to our sympathy with men who find their usefulness and earning capacity at the start curtailed by the introduction of machinery; but in the progress of the world, individuals have always figured as negligible factors—indeed, there can be no progress without some putting aside of old methods or material and a readjustment of men. The law of compensation comes in here, but, unfortunately, it leaves some people temporarily disappointed.

Will America be able to hold its own indefinitely in electrical work? What will be the conditions when Europe takes a leaf from our book and adopts our methods of manufacture? These are questions of great moment to our own manufacturers, and few critics would assume to answer them authoritatively. But there are certain factors involved in this matter which would seem to make America's continued hold on foreign business, if not absolutely certain, at least highly probable. Thus, if it be assumed, and the assumption is a fair one, that Europe will in time adopt our machine methods, so that the cost of labor on both sides of the Atlantic approaches to equality, the case will then resolve itself into a mere matter of competition based on the cost of the raw materials and the cost of motive power to drive the tools. Viewed from this standpoint America can certainly hold its own with the rest of the world. Our copper mines are inexhaustible; our iron and steel are without limit; we are suffering from an overproduction of cotton, and as to coal for motive power we are conditioned probably more favorably than any country in the world of like extent, not to speak of our water powers. Here are facts and figures which cannot be brushed aside lightly. They certainly indicate the opportunities open to our electrical manufacturers if all the favorable conditions are fully taken advantage of. With proper design of machines, so as to secure economy in material and cheapness in machine work required, there ought to be nothing to stand in the way of our retaining our hold on the foreign markets already ours and of extending them to other fields.

This Glasgow order has other points of suggestion also. If one American firm alone had won these big contracts, it might have been put down to singular individual merit; but when we see the Westinghouse, Walker, Sprague and General Electric companies all sharing handsomely in this trade, and when we see other electrical lines also in demand for export, the only conclusion possible is that the average quality of American electrical output is very high and that the prices this country can sell at profitably are below those of the rest of the world. Long may such conditions continue!—*Electrical Engineer.*

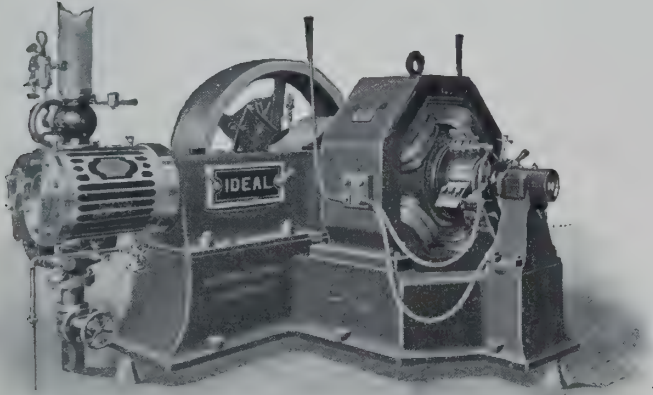
—A chain improvement has just been brought out which is a simple but ingenious little device designed to remedy an aggravating "chain trouble"—the loss of the nut. The bolt lock, as the device is styled, is intended to render a nut unnecessary, the countersinking in the lock fitting snugly over the head of the bolt and holding it in place.

—In an improved roll, designed to modify or eliminate the disagreeable click of the typewriter, circular heads of a diameter sufficient for the desired roll are secured by hubs to the spindle mounted in the carriage. A cylindrical tube of rubber or like material, inflated by a valve with air or other fluid to any desired density, is attached to the peripheries of the heads, the rubber deadening the sound of the keys, and producing a better imprint.



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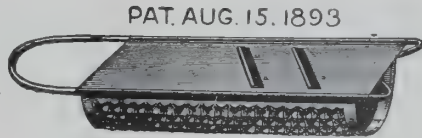
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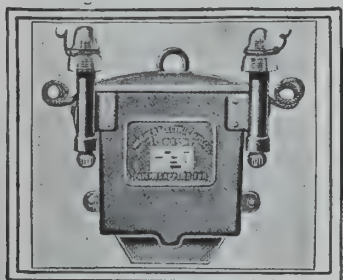


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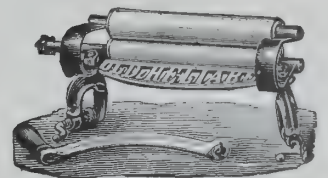
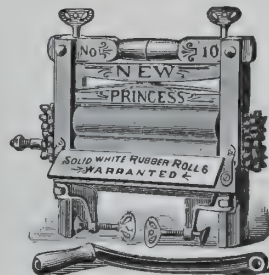
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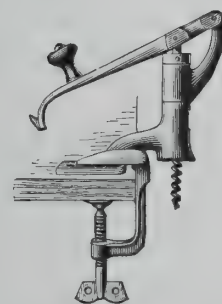
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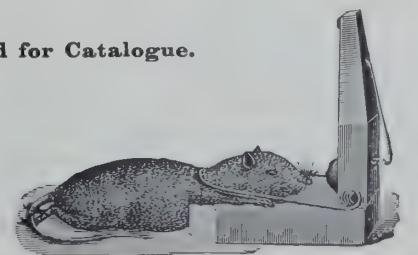
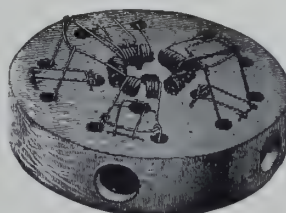
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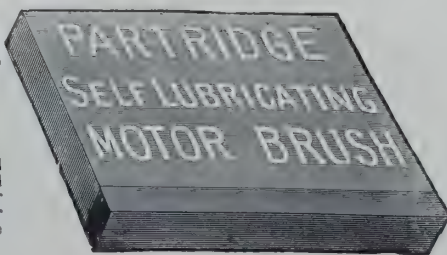
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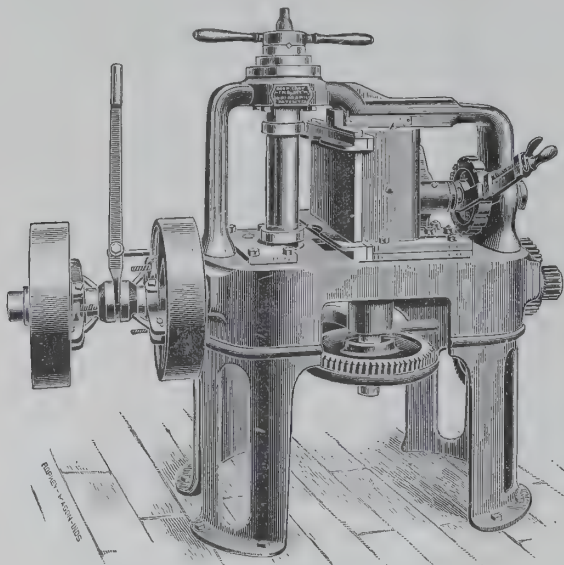
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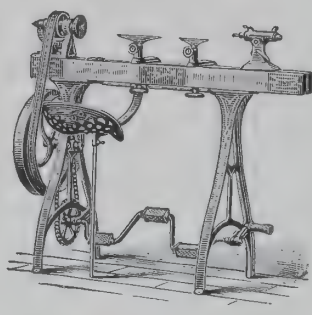
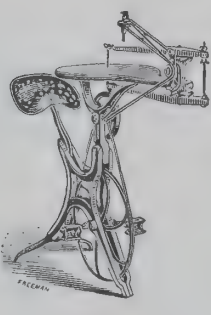
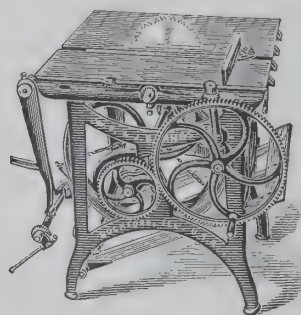


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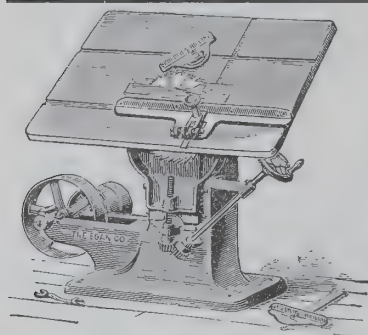
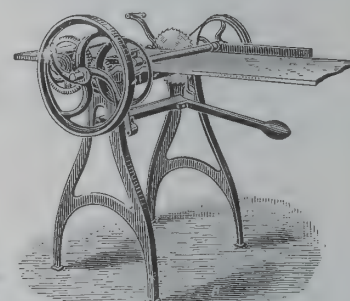
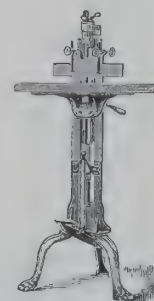
## Barnes' Patent Foot, Hand and Steam Power Machinery

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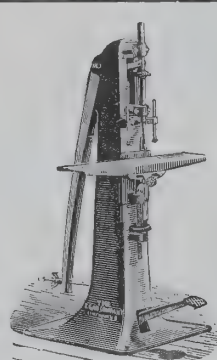
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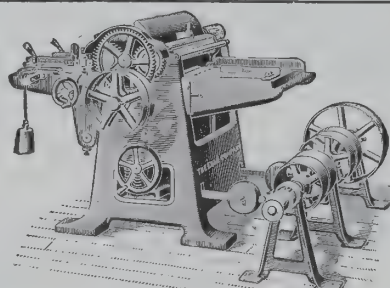
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791 Ruby Street, ROCKFORD, Illinois, E. U. A.



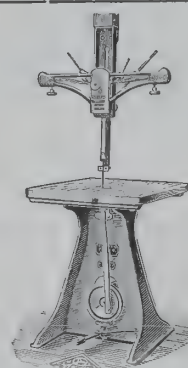
No. 1 Variety Saw.



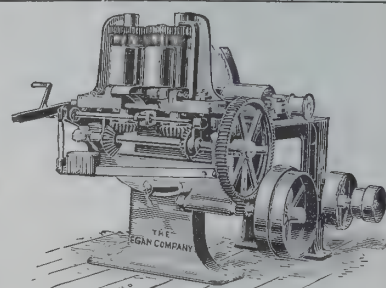
Foot Mortiser.



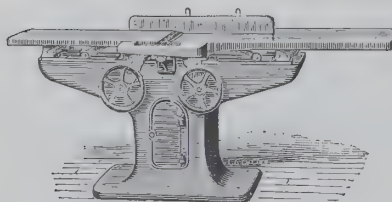
No. 2 Planer, Matcher and Molder.  
Planes 24 inches wide, 6 inches thick.  
Matches 12 inches wide.



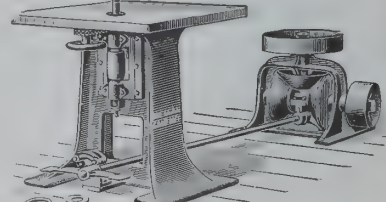
No. 2 Scroll Saw.



No. 2 24-inch Circular Resaw.



No. 2 Hand Planer.

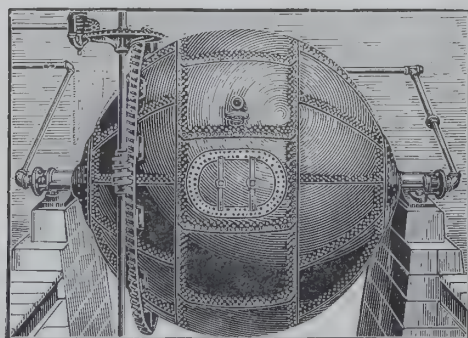


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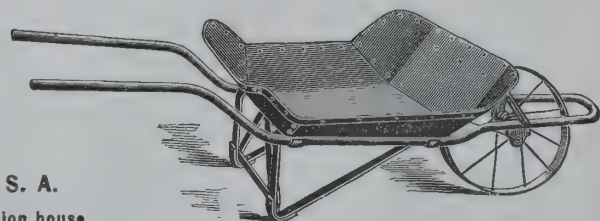
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### The Almond Engine.

A REAL novelty in the line of steam engines has lately interested the mechanical world of the United States. It is a rotary engine of some promise and is thus partly described by the *American Machinist*: "We may say at the outset that although this is certainly a rotary engine, it is one to which none of the standard objections apply, and it will be to the interest of any one who wishes to investigate it, to look at it absolutely without any of the traditional prejudices which rotary engines have up to this time fairly warranted. Those who have been considering the advisability of assigning to the rotary engine a status similar to that to which perpetual motion and other visionary schemes are relegated, may well, in the presence of this engine, revise and reverse their attitude.

The main revolving piece is a casting consisting of four cylinders with closed inner ends, and so placed that the centre of each is tangent to a circle of considerable radius. Through the centre of the casting is the shaft which it revolves, and round it is the valve in the form of a circular piece of metal, fitting snugly to the side of the cylinders, with which it communicates by four holes leading to the bottom of each, the operating steam having its entrance and exit through them. The trunk pistons, which operate in the cylinder, have a sort of pivoted shoe on the outer end. The curved face of the shoe runs constantly in contact with the curved interior of the shell. The edges overhang the piston on each side, and travel in circular grooves in the shell and cover, which loosely hold them from dropping away from the circular shell surface. The revolving cylinders, the pistons and their shoes are all the moving or working parts that the engine has.

The centre of revolution is not in the centre of the shell or main casing. The engine runs but one way, and there seems to be no possibility of reversing it by any change of part arrangements or otherwise, though it can of course be built to run in either direction. As the faces of the swiveled shoes fit the circular interior of the shell, and travel close to it at all times, they cause the pistons to move in and out of the cylinders on account of the eccentricity of the shaft in relation to the periphery of the shell. The drive for each individual cylinder occurs during the ascending half of the revolution.

Now, when we come to enquire as to how the steam operates to turn the shaft, we encounter a rather curious condition. Although there is a piston to each cylinder, and although the pistons are very necessary, they do not, by their thrust cause the shaft to revolve. They have no thrust. The shoe is swiveled upon the piston by a practically steam-tight joint. On the face of each shoe there is a shallow cavity of the same area as the cylinder or the end of the piston, and this cavity has always an open steam communication with the steam in the cylinder, by means of a small hole lengthwise through the piston. As a consequence, the piston, instead of being in a position to thrust, is always balanced, or in a state of equilibrium longitudinally, so far as the steam pressure is concerned. As the engine is run at a high speed, there is always considerable centrifugal force operative on the pistons, and this is found sufficient to hold the shoes practically steam tight to the shell, but there is no ultimate rotative effect from this centrifugal force. Whenever there is any steam pressure in the cylinder there is always pressure against the bottom of the cylinder, which produces the rotation.

The power developed by this engine may be computed as with any reciprocating engine. Here are four single acting cylinders, four inches diameter and, say, three-inch stroke, each operating once for each revolution. Say that we have eighty pounds steam pressure, that steam is cut off at two-thirds stroke, and that the engine runs 400 revolutions per minute. The sum of the strokes of the four pistons is, say, one foot, and the mean effective pressure for eighty-pound steam cut-off at two-thirds stroke, say, seventy-two pounds. Then:

$4^3 \times .7854 \times 72 \times 1 \times 400 \div 33,000 = 10.96$  I. H. P. A test of the engine, made by Prof. James E. Denton, with pressure and revolutions as above, has shown 8.37 brake horse power. The difference in these figures does not show the friction of the engine, as the cylinder pressure could not have been as great as assumed above, on account of the speed. Test for water consumption made in connection with the above showed excellent economy.

The engine is certainly an extremely interesting and promising one. It may be changed in different details, either of construction or operation, as its use develops. Shorter strokes and still higher rotation open to it many opportunities for direct application in electric and other service. It should be an excellent air motor, for which there is now a wide and open field.

### A New Acetylene Lamp.

A NEW YORK watchmaker has invented a lamp for burning acetylene gas in which he claims the element of danger present in most contrivances for the production of the gas is lacking. This safety is said to come from treatment of the carbide by a secret process. The lamp, when ready for lighting, stands about a foot and a half high. The body of it forms a sort of urn of brass nickel-plated, with a capacity of one and a half gallons, and open at the top. In this urn is set the gas-generating part of the lamp, terminating in the burner. This consists of an inner and an outer cylinder. The outer cylinder is about four inches in diameter and is open at the bottom. From the top projects an ordinary gas burner with a cock. The inner cylinder, or carbide holder, is four inches high and small enough to fit loosely in the outer cylinder. The lump of carbide, which may weigh as much as a pound and a half in a lamp of this size, is put into this cylinder, the mouth of which is closed with a grating, on which the carbide rests. It is then set on a standard, the grating being down and the open end of the carbide holder up. Next the holder on its standard is inserted in the outer cylinder and locked in with a spider at the bottom.

Everything is now ready for the generation of the gas, a gallon of water having been poured into the urn. The outer cylinder containing the carbide holder is set into the urn, the water meets the carbide and decomposes it into lime, giving off acetylene gas which passes up through the cylinder into the gas pipe. The secret process through which the carbide is put prevents it from generating gas too fast for the consumption of the burner, and so, by pressure, forcing its way out through the water. The light thus produced is so white and vivid as to be trying to the eyes until mitigated by a globe, when it becomes an excellent reading light. There is no odor and little heat.

There are two drawbacks to this lamp. One is that it cannot be turned down except very slowly. Another is that it cannot be turned out and left standing, because the continuing generation of gas would result in such a pressure that it would force its way out through the water. Danger of explosion from this cause there is none, the inventor says, the only difficulty being that the gas would make an unpleasant odor in the room. When the lamp is turned out the cylinder should be removed. The inventor has contrived a way to mitigate this fault, although it does not do away with it. Inside the urn is a support which will catch and hold the carbide holder out of the water. To stop the working of the lamp the light should be turned off, the cylinder raised to this support, and the lamp again lighted. There will still be a generation of gas, because the lime of the decomposed carbide rests on the grating and acts as a sponge, furnishing moisture which continues the work of decomposition for thirty-five or forty minutes. The relighted lamp may be left with perfect safety. It will burn out when the process of generation ceases.

### American Tools and Hardware in Germany.

THE following is an extract from a report of Consul Crane who, writing from Hanover, says: "The principal enterprise now on foot in the Department of Transportation is the extension of the net of electric lines far out of the city to Hildesheim, fourteen miles away, and the engraftment thereupon of not only a light but also a heavy freight traffic. It would not be surprising should wide-awake representatives of United States firms interested in such constructions find that there are devices at their command which the Germans would be glad to adopt.

"In this connection it may be remarked that the frequency of railway disasters in this country of late has awakened public attention to a degree that might be suggestive to some of our United States inventors and manufacturers of railway appliances. In an incident of this kind that occurred near here but a few weeks ago, one of unusual severity in its consequences, it was frankly admitted that had not the American air brake operated perfectly the loss of life must have been much greater. To take advantage of such a hint as this the parties interested must be on the ground, and for a long time, too, in order to make investigations on their own account and in their own way, as opposed to the manner in which official investigations are conducted.

"In one department the superiority of United States products seems to be ungrudgingly admitted, i.e., in tools. A prominent piano manufacturer here will use none other than those of American make. The general statement holds of dental tools, engines and chairs. United States nails and wood screws (iron and brass) are of much better quality than those made here. The former can be driven; the others have to be coaxed into place, being of too soft material."



### A New Speed Indicator.

A USEFUL little instrument has just been brought out called the Paragon ball-bearing speed indicator. The name by which this class of instrument is designated is neither a happy one nor altogether correct, though it seems to have been generally adopted. The new instrument is a vast improvement upon the old styles. It is provided with a pistol grip and trigger, and resembles in outline the shape of that small firearm, the indicating dial being attached to the barrel directly above the trigger, as it were replacing the sight.

The device is worthy of some attention, if merely as a sample of exhaustive invention in a limited field. The designer set out to produce the most perfect article of the kind which could be devised. It is known that he has spent a good deal of time and much money upon it, and he seems to have secured more desirable features and fewer that could by any possibility be considered objectionable, than it would at first seem possible to embrace in a thing so small and simple. The first thing was to provide a ball bearing to take the thrust of the spindle when pressed against the shaft whose revolutions were to be counted. Then the uncertainty in stopping and starting the old speed indicator was looked out for. The spindle of this instrument may be placed in position and may be running all right, but no count will be made until the trigger is pulled, and the counting or recording ceases instantly when the trigger is released, which makes it easy to take a record for any minute, half minute or any other measured interval of time. In this instrument no matter in which direction the spindle turns the recording dial always turns and counts in one direction. A brake holds the dial from turning when not in use. The instrument registers continuously from 0 to 5,000 revolutions, and then goes on and repeats, but if continuous counting is not required the register is easily and instantly turned to zero for a fresh start.

The dial face is a single revolving plate, having graduations on the periphery reading to 100, and an inner circle with 50 divisions suitably marked for reading the hundreds. The edge of the dial has a hundred teeth with which the worm engages, as with the common indicator. A fixed pointer on the case indicates where the readings are to be taken. A smaller pointer for the inner circle seems to travel around with the entire dial, but for each revolution it really advances, or rather moves backward, one point or records 100. Fixed to the back of the dial is a spur gear of 49 teeth; another gear free to revolve has 50 teeth. These gears are of the same diameter and both mesh into an idler pinion on a fixed stud, so that one tooth less than a complete revolution is made by the one for a complete revolution of the other. The 50-tooth gear is mounted on a sleeve with a taper hole, and the taper spindle in it carries the pointer on the front and has a milled head on the other end with a push spring under it. When the spindle is pressed forward it is freed on the taper, and it, with the pointer, may be moved and set as desired.

The spindle of the instrument carries a double worm, one end right hand and the other left, which fits loosely upon the small part, and a screw in the worm projects into a helical groove on the spindle; when the spindle is turned in one direction the worm goes as far one way as this groove will permit, and when the revolution is in the other direction the worm runs along to the other end of the groove, in one case bringing the right-hand worm to engage with the dial, and in the other case the left-hand worm is engaged, thus insuring that the dial will always travel in the same direction.

A little spiral spring keeps the dial case raised up, so that the teeth on the edge of the dial do not engage the worm. When the spindle is running and it is desired to make a count the case is pulled down by pressure on the finger-piece or trigger, and removing the pressure of course stops the dial again. If the trigger is pressed slowly, and the dial case is brought only partly down, the first action is to press the end of a little wire spring which bears as a brake on the gears behind the dial and prevents rotation. When the brake is thus released the dial may be freely turned and set as desired. To set the inner pointer the dial case is brought down so that the worm is engaged, thus holding the dial from turning, and by pressing forward the central spindle, as before described, the pointer for the smaller circle may be set. The end of the spindle which takes the thrust is conical, and bears against three steel balls in the screw plug, which allows it to turn quite easily. This plug is screwed in by a pin wrench to adjust the spindle to the forward shoulder as may be required.

### Turbine Engines.

A WRITER for *Industries and Iron* speaking of the future of turbine engines says: The general impression I have formed from the trials is entirely favorable to the prospects of this novel method of marine propulsion. The mechanical simplicity of the turbines and the absence of exposed parts and of working joints will go far to secure them against breakdown. They have a distinct advantage over ordinary engines in first cost, in probable cost of maintenance, and in cost of attendance, as well as in bulk, in weight, and in freedom from vibration. There appears no reason to doubt that in regular use at sea their running will be as consistently steady and good in every way as it has been throughout these trials.

The application of steam turbines to torpedo boats, destroyers, gunboats and cruisers is to be anticipated from their unique capacity for developing great power and high speed with light and compact machinery. Apart, however, from these uses, it appears to me highly probable that they will in time be adopted in the mercantile marine. The conditions in a fast passenger steamer are favorable to the economical application of steam turbines, and in such steamers the smoothness of their running will be a strong recommendation. I see no drawback likely to detract from the advantages which they plainly possess.

In conclusion, the application of the steam turbine principle to fast ships in general, including passenger vessels, Atlantic liners and ships of war, would appear to present no special difficulties. It may be said, generally speaking, that the larger the scale on which the engines are made the simpler is the construction, the higher the steam efficiency, and the lower the speed of rotation. In the sizes hitherto constructed (the largest being the engines of the *Turbinia*) this has been found to be the case. In applying turbine engines to a large passenger vessel or warship of say 30,000 I. H. P. probably four screw shafts, with two screws on each shaft, would be adopted; each of the four shafts would be driven by one compound turbine at a rate of between 400 to 700 revolutions per minute, and the turbines would consist of the high pressure, the intermediate and two low pressure, each turbine developing approximately one-quarter of the total power. The screw propellers would be about one-half the diameter of ordinary twin-screw propellers, and the aggregate blade area would approximate closely to ordinary practice. With such engines the consumption of steam per propulsive horse power would probably be less than that found in the mercantile marine, and considerably less than that found in engines of war vessels, where space and other conditions must necessarily be considered. There is also no limitation in steam pressure in the case of turbines other than those imposed by the boilers, and it is probable that in conjunction with water-tube boilers higher pressures than those at present usual would be generally adopted. With turbine engines in passenger vessels there would arise no questions of vibrations from machinery or propellers, and in the event of one screw shaft or one motor becoming disabled, the one affected can be more readily taken out of action than is the case with ordinary engines, and the parts, being lighter, can be more easily dealt with by the staff on board; thus the liability to serious breakdown is considerably reduced.

### New Magazine Rifle.

ALVA WILSON, an inventor of Wichita, Kan., and an expert marksman, has just perfected a magazine gun, or rather an attachment for any rifle of standard make, whereby the rifle is transformed into a magazine gun. The attachment is simple, effective, and easy of operation. The magazine is of the same length as the rifle barrel, and is composed of six tubes of brass or aluminum, which revolve upon a central axis, and each contains thirty cartridges. It is fastened underneath the barrel by a simple contrivance, and feeds the cartridges, one by one, into the chamber in the same manner as the ordinary repeating rifle operates. It can be fired just as rapidly as it is possible to move the hand back and forth from four to six inches along the rifle barrel. When the thirty cartridges in the first magazines are exhausted, a very slight and simple twist of the magazine with the thumb and finger places the next chamber of the magazine in position for firing. In like manner the entire six chambers of the magazine can be emptied. The operator can fire the whole 180 shots in one minute, and, it is claimed, in even less time if he is an expert in the use of the gun, and is able to increase the speed of the oscillating movement.

Each of the six chambers of the magazine is fitted with steel springs, which are pressed into a compact coil when the chambers are filled with cartridges, but which push the cartridges back toward the breech as the chambers are being emptied. The process of reloading is very simple. The gun is placed with the muzzle downward, the breech of the magazine is opened for refilling by pushing a slide, and the cartridges, which are held in separate tubes, each containing thirty-two, are emptied into the chambers of the magazine. The six chambers can be loaded in almost as many seconds. One minute after Mr. Wilson has emptied the magazine he can have it refilled and be ready to fire 180 more shots.

The device for filling is a simple tube, one end of which is closed with a lid held in place by a spring. If it is desired to minimize the loss of time in reloading, a sufficient number of filled tubes are suspended from a belt fastened around the body under the arms to replenish the magazine as many as a dozen times. In this way, allowing one minute for firing 180 shots and one minute for each reloading, it would be possible to make 2,160 shots in twenty-three minutes. The inventor claims that he can fire that number of shots in the given limit without the barrel of the rifle becoming heated. Mr. Wilson has made and now uses one of these repeating mechanisms fitted to a 32 calibre Winchester rifle. It adds immeasurably to the pleasure of hunting and trap shooting.

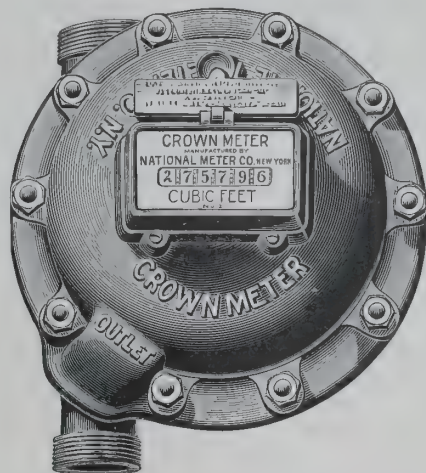
The rapid firing Borchardt pistol or rifle is fired with a movement of the finger, but the rifle with his attachment is fired with a "whole arm" movement, and, while the finger would become stiff and refuse to pull the trigger at the rate necessary to fire 200 shots per minute, the "whole arm" movement may be kept up for a much longer time without weariness. The excessive weight of the arm seems the only objection to its becoming a practicable weapon, and this will be minimized.

THE great furnaces of the Carnegie Company have been making new records at Duquesne, but another experiment has been going on at Dunbar which is destined to have its effect on the production of iron and steel in the United States. The Dunbar furnaces have been trying the ore separated from low-grade rock by Edison's new process, and it has proven so satisfactory that 1,700 tons of the ore have been ordered. The Edison ore practically enjoyed the benefits of separation before it was loaded on the cars, for the electrical process is designed to remove the ore from the rock with which it is associated. Hence when it comes to be shipped from the ore banks to the furnaces the waste has been eliminated, and the ore alone is transported. Naturally, an ore that carries with it so little waste means a great difference in freight costs.



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J. C. CUSHMAN,  
Chairman of Water Committee.

**They increase the revenue,  
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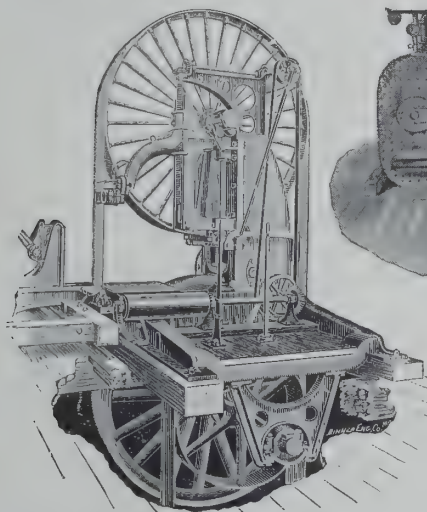
We have many letters of similar character, copies of which we would be pleased to mail you.

## NATIONAL METER CO.

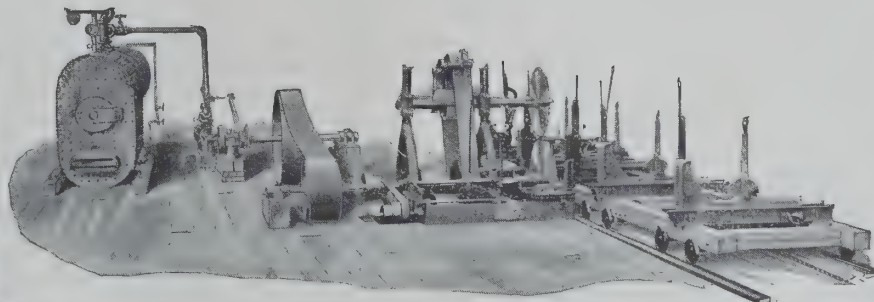
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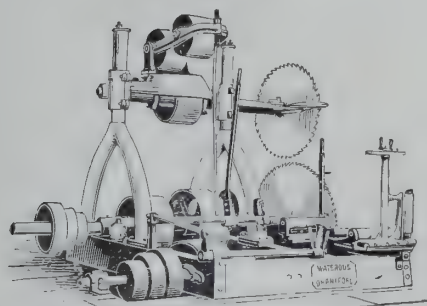
BAND RE-SAWS—For Saw Mills. Increase largely quality and quantity of daily output.

STEAM-ACTING SAW MILL APPLIANCES.

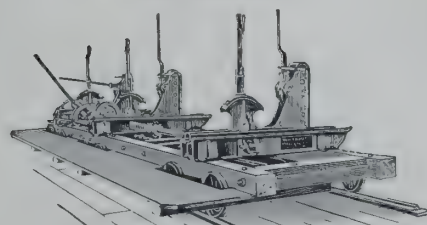
PULP WOOD MACHINERY.

BARKERS—With automatic turner; one man barks 15 cords, 10 hours

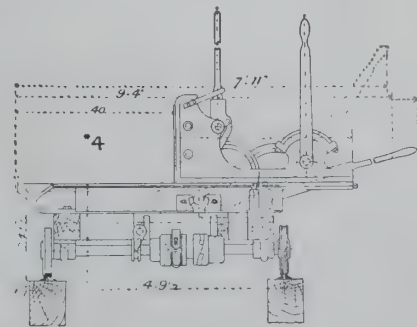
AUTOMATIC CUTTING-OFF SAW—2 men with this machine cut 60 cords of pulp wood 16 to 24 inches long, or 100 cords 48 inches long in 10 hours, taking logs from water and delivering cut wood to conveyor.



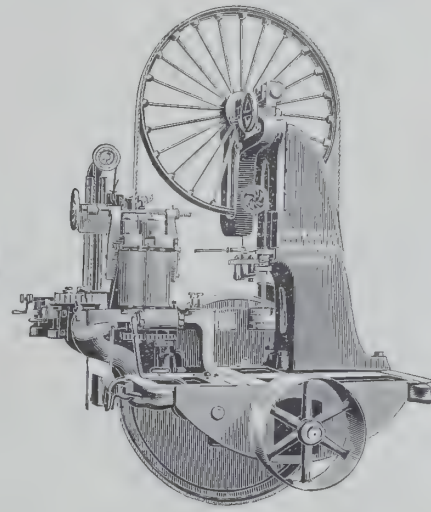
Saw Frame No. 3.



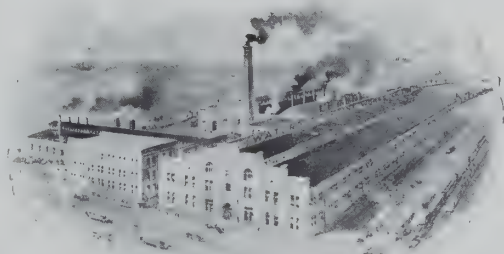
No. 5 Log Carriage.



No. 4 Carriage, showing Off-set for Band Saw.



Band Re-saw.



Established 1844.

New Works, 1896.

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### Edison's Great Work.

REFERRING again to the Edison system of ore crushing and separating, which has created no end of interest in this country and abroad, Mr. Theodore Waters, in a current number of McClure's Magazine, tells us that the world's annual output of iron ore does not reach 60,000,000 tons and the annual output of the United States is about 15,000,000 tons, yet even within the two miles square surrounding the plant there is enough ore in the rocks to keep the whole world supplied for one year, even with the natural increase in demand. The production of low-grade ore, however, unless carried out on a gigantic scale could not practically be carried out at all. Even those engineers used to large operations assured Mr. Edison that no machine could be constructed powerful enough to crush five, six and seven ton rocks, nor could any machine withstand the terrific jar which would result. Nevertheless, Mr. Edison invented such machinery and so completely that not even 100 horse-power is required to reduce rocks weighing six and seven tons to dust in less than three seconds from the time they are thrown into the crushing machine. What Mr. Edison has done, says Mr. Waters, has been to subdue to his service three great natural forces—momentum, magnetism and gravity.

The big rocks are not, strictly speaking, crushed by the direct power of an engine or dynamo; momentum alone turns them into dust. No mechanism assists in the separation of the ore from the sand; magnetism does it all. Except for the elevators which raise the ore to the cupolas of the buildings there is in many of them no machinery; gravity does all the work. In fact the whole plant is a wonderful example of automatic action. Every part is connected with the other parts and the aggregate is as compact and as self-sustaining as a modern rotary printing press and is even less dependent on human agency for assistance. From the time the ore is blasted, with its native rock, out of the mountain side until it is loaded in the form of commercially pure iron briquettes on the cars it is not touched by human hands.

We are told that the steam shovels have a capacity for lifting ten tons of free rock a minute, while the plant's crushing capacity is one-fifth greater than that of all the stamp mills in California, or "enough to level in an ordinary lifetime the proudest of mountain peaks, while the magnets have enough combined pulling capacity to raise a modern great gun clear from its deck-facing and drop it over the side of the vessel into the sea." The sand ore is mixed with an adhesive material and made into briquettes about three inches in diameter. Twenty eight hundred of these are contained in one ton. An average freight car holds twenty tons. Thus seventy-five car loads of pure iron are wrested daily from heretofore worthless rock—a well-deserved triumph for the inventor and a blessing to mankind.

### Ball Thrust Bearings.

AN improved form of ball bearing is now widely used for relieving the friction of thrust. Wherever this is excessive, as on drill spindles, worm gears, propeller shafts, etc., causing heating and loss of power, ball bearings of this sort have been applied with a large gain in ease of running. To prove that this gain was not imaginary, and to form an idea of its actual amount, a small up-right drill was tested first with ordinary thrust collars and then with ball bearings. In the first case the largest hole that could be drilled was  $\frac{7}{8}$ " diameter. After the application of the ball bearing a  $1\frac{1}{4}$ " hole was drilled without any change in belting or driving gear. The stock removed in the second case was double that in the first, but the gain was greater on account of the longer leverage on the tool. A leading machine tool builder states that he has used one of these bearings on a chucking lathe for seven months, ten hours a day, and that it is the only device he has been able to find that would run in that place without heating.

The bearing consists of two hardened steel washers ground to a true face on both sides, and a ring of balls retained in a light brass cage. The balls project through the sides of the cage so as to bear on the washers, the cage being simply carried round with the balls. The latter are staggered, so as to cover the entire surface of the washers, and this arrangement effectually prevents the balls wearing in grooves. The bearing when applied to the spindle of an ordinary drill does not involve any change in construction, and may be put on new or old drills with equal facility.

### Aluminum Cheaper than Brass.

SEVERAL months ago a large Pittsburg metal company informed the trade that for large orders they would make prices for aluminum sheet which would compete with the selling price for similar brass sheets. A price list was issued on the 15th of October last materially lowering the ordinary rates for aluminum sheet, and a later one followed a few weeks ago by which it can be seen that even in small quantities sheet aluminum is as cheap as brass.

Due to the difference in "specific" gravity or weight, in comparing the price of aluminum with brass sheet, aluminum sheet should be compared square foot for square foot with brass sheet, and not pound for pound. Thus, aluminum sheet about 1-32 of an inch thick will weigh one half pound to the square foot, whereas a square foot of brass sheet of the same thickness would weigh about 1.6 pounds. Any manufacturer, therefore, in buying aluminum sheet or brass sheet will consider how many of the articles he intends to manufacture can be cut out of a square foot of sheet. If, as we have said, a square foot of 1-32-inch brass sheet will weigh 1.6 pounds, and a square foot of the same thickness aluminum sheet will weigh only one-half pound, then any one would be as willing to pay in the ratio of 16 per pound for the aluminum sheet as at the rate of 5 per pound for the brass sheet, for in either case he would be paying

the same amount of money and would get the same quantity of sheet, measured in square inches of the same thickness sheet.

In electrical trades these figures mean much when the tensile strength and conductivity of aluminum are considered. The latter though it is only 60 per cent. of that of copper in the form of commercial wire, yet weight for weight its conductivity as compared with copper is 2 to 1, while on the other hand the conductivity of brass is usually less than that quoted for aluminum. Leaving these questions aside, however, and considering the mere fact that sheet aluminum is as cheap as brass, area for area, it would be hard to foretell the limit of its ultimate expansion in the mechanic arts generally. Commenting upon the subject the *Electrical Engineer* says: "This is only another example of the influence which electrical progress is exerting on the manufacturing industries of the world, and more specifically the influence of cheap power toward the same end. For it must not be forgotten that the prices above quoted have been made possible only by the employment of the cheap Niagara water power to which the aluminum industry was transferred but a comparatively short while ago. These influences have just begun to manifest themselves and we make no doubt that as time passes further marked changes of condition will ensue in the industrial arts due to the causes above mentioned."

### Lessening Cost of Steam Power.

AN interesting paper on the lessening cost of steam power was read at the annual meeting of the American Society of Mechanical Engineers on December 1st last, by Mr. F. W. Dean of Boston. He dealt with the reduction in the cost of steam power since 1870. Twenty-seven years ago, he said, the Corliss simple condensing engine was the most economical in use, and this consumed nineteen or twenty pounds of steam an hour for each horse power developed. In other words, that weight of water had to be turned into steam every hour for each horse power developed. To-day, in the best types of compound engines, only a little more than one-half this quantity of steam is needed, or eleven and one half pounds. In the near future, he said, the use of superheated steam offers such further economics that we have a right to anticipate a further reduction of the amount needed to produce a horse power for an hour to ten pounds.

Mr. Dean figures that the saving effected by the use of compound engines, steam jackets, steam reheaters, higher pressures of steam and greater expansions is 37 per cent. Another saving of 5 per cent. is made by using vertical engines instead of horizontal; vertical, internally-fired boilers of the locomotive type save 7 per cent. more, improved grates 2 per cent., so that there is a direct saving altogether of 58 per cent. over the cost of steam power twenty-seven years ago. To this may be added a reduction in the cost of coal of 46 per cent., and to this a further reduction due to the smaller cost of a plant to-day and lower interest charges. Including all charges, Mr. Dean figures that in 1870 one horse power in a 1,000-horse-power plant, cost \$38.14 a year, whereas on a consumption of ten pounds of steam per horse power per hour, such a plant should be run now upon a cost of \$16.31 per year per horse power, although \$20 a year is the generally accepted figure.

### Testing Wear and Tear on a Locomotive.

THE New York Central Railroad Company recently made a most thorough investigation at no small expense to ascertain what portions of a locomotive wear out most quickly and in what ratio the several parts wear out. For this purpose the famous engine 870 was taken into the shops and completely overhauled, that is, taken apart and every piece of the engine from the ponderous driving wheels to the smallest bolt and nut separately weighed, the greatest care being taken to have the weighing accurate. When all parts had thus been weighed skilled mechanics went to work to rehabilitate the engine and when complete it was again put into service as before. Some months afterwards it was taken back to the shops and completely dissected again, once more every part being separately weighed and the result compared with the former one, thus enabling an exact estimate to be made of what the engine had lost in weight through the wear of a known amount of work. The records of the weights of the several parts at once showed which of them were subject to the most wear. In both instances the small parts were weighed on a pharmacist's scales.

### A Practical Flying Machine.

THERE seems as if there were at least a possibility of a practical flying machine after all. Professor Langley, of Washington, and Professor Watkins, of New York, who some time ago constructed a machine that gave evidence of a great measure of success, recently brought their invention to Mount Holly, N. J., where it was attached to a car on the Medford branch of the Pennsylvania Railroad and demonstrated some ability as a motive power. The car used was a flat car and was dragged along at the rate of three miles an hour, which seemed to gratify the learned gentlemen. Professor Langley says the propellers do not revolve fast enough to get the best results, and that he can easily perfect this defect and have a better and stronger machine. On the whole, however, the tests do not appear to have been very satisfactory. The machine was taken away and shipped to Camden. It is said some improvements will be made there and then the experiments continued. There is a gasoline engine in the machine and the power is supplied to two propellers, about 4 feet long, and they make about 600 revolutions a minute. The two professors are of the opinion that a machine can be constructed that will draw a car at the ordinary rate of speed now allowed on railroads.





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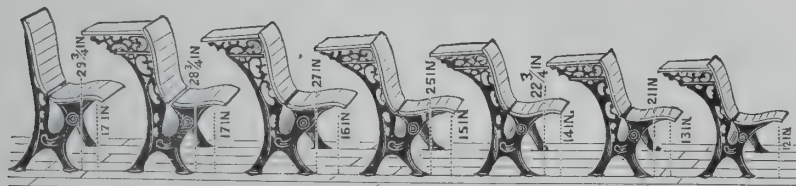
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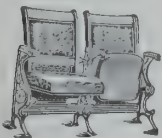
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Faithfully yours,

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### CAR COLORS.

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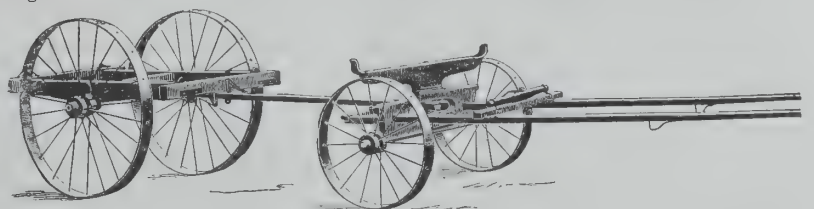
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CHARLOTTE, MICH.,  
March 17, 1890,

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Dear Sir:—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Green are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

Yours truly,  
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THIS CART is used for hauling lumber and various other material. One horse with forward truck will keep ten or a dozen rear trucks employed. The load is balanced on rear truck. When the two trucks are coupled together they make a complete lumber wagon.



NO. 1 LUMBER CART.

This cut shows the two trucks coupled together, the same as an ordinary wagon. The reach has a hook at the end to hook into the draw staples of the rear truck.

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### Economies in American Machinery.

AMERICAN machinery has the gift of economy. It is a saver of time, labor and money. Along these lines it has no contemporaneous equal and is practically without precedent in the industrial history of the human race. It is to this and related qualities that it owes its prestige and popularization, and is in a fair way of holding a supreme position in the world's markets. For the same reason we have moved upwards to industrial eminence and are in fair prospect of attaining its leadership. In domestic economy we are sinners, but in industrial economies we are models and masters. It is true that we have enormous machines and operate leviathan plants, and the idea of bigness has reached an impressive climax, but even in these we have an assemblage of economies that makes results proportionate to the magnitude of the methods in vogue. In the larger tool we have the thrift devised in the smaller. A keen observer of American machinery and methods recently in this country made the observation that "the biggest things in this country are the little things." In these few words we have the key of the situation. They were prompted as a result of investigations made in the management and methods of a large machinery concern, in which the foreign observer, while giving due credit to travelling cranes, iron planing machines, lathes and other equipments of an impressive character, made mental note of less obtrusive but equally efficient tools, that in economy of operation were greater marvels than their larger companions. The same impression has been duplicated in numerous instances where the critical observer has made a comparison between American mechanical methods and those of the older countries. Instances might be multiplied indefinitely in which the same American characteristic is strongly accentuated. In the careful study of little things, in ingenious appliances to avert the leakage of waste, and in the economy of time and labor, there can be no discount on the premium claimed for American machinery in this direction. In securing a competency of strength from a given weight in construction, in efficiency at least exhaustion of labor, and in demand for special skill in manipulation, with a corresponding deduction in first cost, there can be no question as to the practical leadership of American machinery in modern manufacture and industrialism.—*Age of Steel.*

### A Keyless Night Latch.

KEYLESS locks have been common enough upon safes and cash drawers since the day of Butterworth's original invention, but to this day all of these permutation locks depend upon eyesight. For years it has been the boast of safe lock makers that their combinations defy the finest sensibilities of sand-papered fingers. That would kill the keyless night latch at the start, because it is a night lock, and must necessarily be worked in the dark. A Jerseyman is the inventor and patentee of the new device, and he is just a little bit afraid that it may add to the volume of profanity in the world, but he feels sure that it will be appreciated by people who invariably go straight home, or home straight, and ordinarily have half a dozen flat keys on a ring, all of which feel alike in the dark.

His latch has no keyhole, and works with a knob which looks like any ordinary doorknob, but is arranged so that it makes a series of sharp clicks as it is turned. These clicks can be felt as well as heard, so that a deaf and blind man can read them as he turns the knob. Two clicks to the left and three to the right will open a door if the combination is set at 23, or it may be set at any figure up to 999, with all of the advantages of the terms involved in a short thousand of numerals. It is extremely simple in its mechanical details, but it would take a stranger some weeks to open the door if he did not have a tip on the combination.

### A Novel Hydraulic Air Compressor.

A RECENTLY patented air compressor consists of an endless chain of bucket working up and down in a vertical column of water. The height of the column of water determines the pressure of the air. The buckets enter the water upside down and empty, or full of air only. As they descend the air is compressed and when the buckets turn to ascend the air escapes upward and is immediately caught in a suitably placed chamber from which it is conveyed by a pipe for use. The buckets ascend full of water, and as they turn to descend again the water is all poured out. No valves or other mechanism are required. The apparatus would seem to be a practical one for limited pressures. For the usual working pressures of, say, 75 pounds a height of nearly two hundred feet for the water column would be required. This might be all above ground, or all below ground, or otherwise as most convenient. For blowing purposes of course no great height would be required.—*American Machinist.*

### A Mixture of Aluminum and Iron.

IT is found that the addition of from two to five pounds of aluminum to a ton of iron renders it grayer and softer, the slag rising rapidly and completely to the surface, and leaving the metal in a far purer and better condition than before. In this case, too, the iron is more fluid in the ladle and can be poured into small molds without any tendency to chill, and the formation of "waster" castings, due to blow-holes, is entirely avoided. The aluminum does not reduce the melting point of cast iron or steel, but increases its fluidity by the removal of impurities. But the effect of a small proportion of aluminum upon steel with medium carbon is to increase its tenacity and impair its ductility. It may also be used in the same proportion in brass manufacturing, and in larger quantities for making "aluminum brass."

### A Helm Angle Indicator.

A USEFUL instrument in shape of a helm angle indicator has been brought out by a Philadelphia company. It is designed to show the helmsman the position of the rudder. The helm angle indicator consists of two parts—the transmitter and the indicator or indicators. The transmitter has a lever traveling over an arc and attached to the rudder post, and making contact with the segments corresponding to the angular arc, and the indication of the instrument is so designed that the lesser angles, which are more commonly used, give a larger indication than the greater angles, which are more rarely used. From the transmitter two small wires are run to the steering stations and such other locations as are desirable. The indicators are inclosed in an iron water-proof case suitable for deck or bulkhead use, having a glass dial covering a  $7\frac{1}{2}$ -inch scale, which is divided into forty divisions each side of zero. When the ship has an electric lighting plant facilities are provided to light the scale with a small electric lamp at night. Two switches can be placed in a convenient location for closing the circuits of instrument and lamp. Current is furnished by a battery of closed circuit cells which require no attention other than renewal about once yearly at a slight cost. Current can also be taken from the electric lighting plant of the ship. If desirable the indicators not in use may be disconnected without affecting the value of the indication of the other instruments. It is claimed that the indicators in no way affect the compass.

### Aluminum Alloys.

NICKEL has now come to be one of the favorite hardening materials used in alloying aluminum and in proportions of from 7 to 10 per cent. of nickel and the rest aluminum the best casting material is produced for purposes where toughness combined with hardness and good casting qualities is desired. Manganese, too, has long been considered one of the best hardeners; it can be cheaply added in aluminum casting metal by means of the rich alloys of ferromanganese, and for rolling purposes by adding the pure black oxide of manganese to the electrolytic bath in which the aluminum is produced. The alloys of manganese give special rigidity and hardness to aluminum, and in combination with copper and nickel one of the best hardening alloys of aluminum yet produced has been obtained. For some time past the alloys of aluminum and tungs have been growingly popular for rolled sheets and plates, to be afterward spun, the material being largely used for military equipments.

### American Bootmaking Machinery.

AN English contemporary in referring to American bootmaking machinery pays a graceful tribute to American skill. It says: "A system of boot and shoe making by machinery, with the result of reducing the cost of production by 40 per cent. and at the same time of doubling the earnings of the work-people, cannot fail to be of great interest to every one connected with the art of St. Crispin." Continuing it states that the shoemakers of Stafford, Northampton and Leicester are now earnestly considering the merits of certain patented machinery, the American manufacturers of which recently demonstrated how by a subdivision of labor the cost of shoe and boot manufacture in the States was reduced to a minimum, and showed how by this machinery a pair of first-class boots could be made and finished for 1s. 4d. and a pair of lower quality for 8d. American machinery is already in use at several English boot factories and in Germany its use is becoming very general.

### Pneumatic Pulleys.

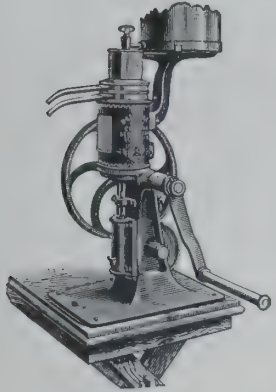
THE lack of efficiency in the ordinary belts employed in manufacturing establishments and power plants, such lack being due principally to the air cushions between the belt and pulley, causing the former to slip, is claimed to be entirely eliminated in the pneumatic pulley, and this simply by means of perforations all around the face of the pulley. These perforations are regularly placed in rows parallel to the axis, the perpendicular position of the perforations of each row alternating with those of the next; the belt very closely grips the face of the pulley and operates, therefore, without the loss attending pulleys, which permit an air cushion between the belt and the face. The use of this pulley, it is held, enables the use of a smaller and looser belt, owing to the elimination of nearly all slip, which with the ordinary pulley is reckoned as being equivalent to a loss of about 10 per cent. in power. A more uniform speed, too, can be obtained between the driver and the driven element, which is an important feature in high-speed work.

### Rubber-Cushioned Horseshoe.

A RUBBER CUSHIONED horseshoe has been recently introduced which appears to be entirely new. It is referred to as being particularly adapted to horses used by fire departments, police or insurance patrols, ambulances and other vehicles required for fast speed or smooth pavements. It has a drop-forged steel frame with an uneven surface both top and bottom over which the rubber cushion is vulcanized. It is so constructed as to leave the bottom of the foot open instead of being entirely covered. The rubber next to the hoof forms a cushion, lessening the concussion and affording relief to the horse travelling on hard pavements. It can be fitted cold and bent over an anvil to any shape desired, which obviates all risk of burning the hoof, as the shoer is obliged to fit it cold.



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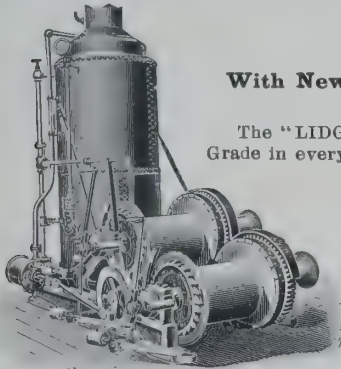
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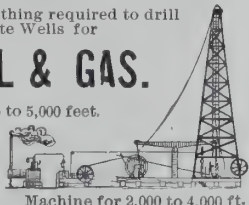
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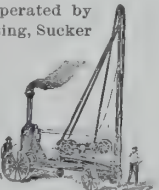
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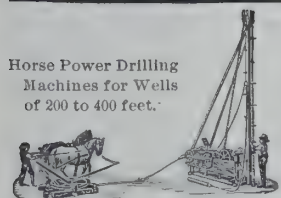
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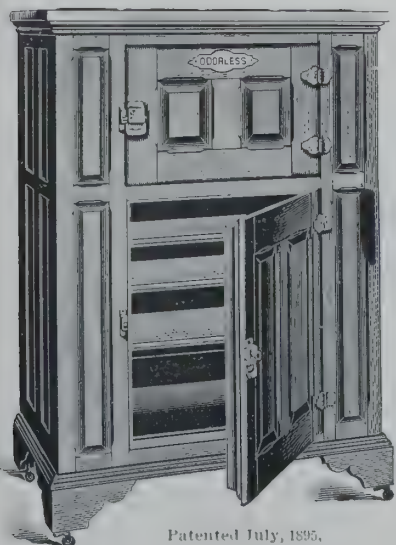
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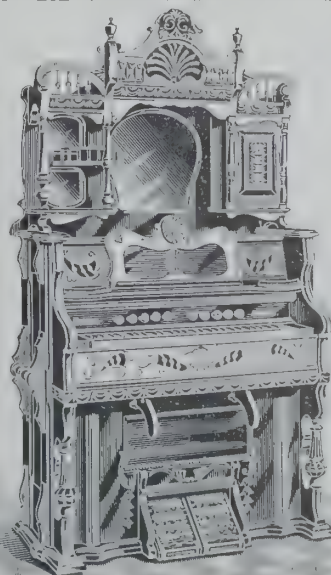
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### Pneumatic Canal Locks.

IN a lecture before the Franklin Institute Mr. Chauncy N. Dutton, of New York, described his invention of pneumatic locks for canals. After giving a brief history of canals and various types of canal locks, Mr. Dutton said: "A lock is the heaviest of engineering structures, carries per square foot a load greater than the load per running foot of the heaviest railroad bridge, and is subject to tremendous and cumulative distorting forces. Therefore, a lock structure must be of simple type and extreme power and automatically guided and controlled by apparatus strong enough to beyond peradventure arrest distorting forces in their incipency. Locks and aqueducts are liable to be rammed by boats. In old-fashioned structures either the structure or the vessel must be wrecked. A steel structure properly designed can cushion a blow so that it will be harmless.

"The work done in perfecting the pneumatic lock may be briefly described as follows:

"First. The substitution of compressed air for water as the support of locks and vessels. Increasing the height of the air column does not increase the pressure, and, therefore, high lifts are operated with the same pressure which operates low lifts.

"Second. The use of low pressures in lieu of high pressures, the air pressure being very little greater than that due to a column of water in height equal to the draught of the locks. The working pressure in the lock with 12 feet draught is 8 pounds per square inch; with 30 feet draught it is 16 pounds.

"Third. Absolute immunity from falling. The pneumatic lock falls up if it falls at all. It is pressed up firmly against the anchors with an effort much greater than the weight of the lock and its load. If the anchors yield the lock is forced up to a height, such that the air in the chamber is expanded to equilibrium with the load, and a volume of water equal in weight to the difference between the load and its initial excess of buoyancy has entered the air chamber.

"Fourth. Water trap valve for controlling the air conduit.

"Fifth. The powerful automatic levelling or synchronizing shafts, of construction, cheap, and such that the price per pound does not increase with increased power.

"Sixth. Dispensing with the dry dock and operating the lock directly in the lower level of the canal in a pit, the pit in which the lock works being part of the lower level.

"Seventh. The substitution of steel, mainly in tension, for masonry. A thin steel plate will do more work than the heavy masonry walls of the Leonardo locks. In most situations the pneumatic lock requires masonry only to support the guides, and has weights for the anchorages.

"Eighth. Substitution of elastic resistance for mere stability due to dead weight, which reduces the strains due to shocks, so that they can be taken care of economically.

"The principal elements are:

"First. The locks, which are identical structures, in balance, each having a lower open-bottomed air chamber on which it floats, and an upper-gated lock chamber, containing the water for floating the boats, and working in a pit formed in the lower level.

"Second. A valve-controlled air conduit system, for transferring air from one lock to the other.

"Third. Anchorages to restrain the superbuoyant elevated lock, these being built integral with—

"Fourth. Guiding structures to prevent the locks from tilting sidewise.

"Fifth. Automatic parallel motion, or synchronizing apparatus, to keep them from pitching endwise.

"The locking members are built of steel, and each like a long gastank, with a gated lock built on top of it. The gates move about a centre, like a locomotive throttle valve, and when open lie back in pockets at the side of the lock, and have buffers or cushions which elastically cushion the blows of the boat.

"The air conduits extend from the air chamber of one lock to that of its mate, and have a U bend which makes a valve like a sewer trap. When the trap is full of water the air conduit is closed, and when the water is drained out of the trap air can pass from one lock to the other. There are side guides to keep the locks from tipping over sidewise and automatic levellers to keep them from pitching endwise. This automatic levelling apparatus consists in racks built on the moving lock, fixed racks built parallel thereto on the piers, and shafts along the sides of the locks and carrying pinions which mesh with the racks on the locks and the parallel fixed racks. As the locks move the shafts and pinions roll between the fixed racks and the lock racks, with which they mesh.

"There is an interlocking apparatus, or sequence machine, which prevents doing the wrong thing at the right time while working the locks, and a governor which keeps the locks from running away and stops them at the right elevation. It is obviously impossible to exactly balance any load, especially a variable one, upon an unstable medium such as air. It was therefore necessary to do one of two things, either to make the lock deficient in buoyancy and provide a rigid auxiliary support, or to make the lock superbuoyant and restrain it from rising too high by the engagement of the lock structure with anchors.

"The latter was adopted after many designs of the first type had been considered and found defective. The elevated lock is firmly held and thrust upward against the anchors, which restrain it with a surplus buoyancy or lift exceeding any possible variation in load or buoyancy. The air pressure in the elevated lock is great enough to expel from the air chamber a weight of water 25 to 30 per cent. greater than the weight of the loaded lock, the upward strain being held by anchors before referred to. This constant working pressure is maintained by a pneumatic accumulator, which is a cylindrical tank, movable vertically and weighted to give the desired working pressure, and which is con-

nected with the elevated lock and has sufficient volume to provide for such leaks as may occur and for changes in the density and temperature of the adjacent atmosphere. The depressed lock floats as a pontoon and requires no care.

"The machinery connected with the locks, besides the interlocker and governor are hydraulic stops or cushions which stop the lock gradually to prevent shock, a hydraulic accumulator and pump, an air compressor to supply leakage and to transmit power to the gate opening engines, the capstans which pull the boats in and out and to interlocking machine and valves.

"The operation of the locks is as follows: The moving power is a surcharge of water in the elevated lock, containing, say, a foot greater draught than the depressed lock. If the boats enter, or if they be left out, it makes no difference in the weight, and when the gates are closed the locks are ready to be translated. If, then, the water be drained out of the big trap valve, the excess of weight in the elevated lock will cause the air to flow into the lighter depressed lock, which will ascend, and the heavier elevated lock will descend, the machine being controlled by the side guides, which keep the lock from tipping sidewise, and by the synchronizing shafts and gearing which keep them from pitching endwise and maintain them perfectly level and true, the motion being practically frictionless or attended only by rolling friction.

"As the surcharged lock approaches the lower level it automatically takes on an additional load of water, inducing a great increase in the compressed air charge, which increase, transmitted through the open conduit to the elevated lock, thrusts it firmly up against its anchors with a buoyancy say one-fourth to one-third greater than the weight of the lock and its load. The main air conduit trap valve is then shut by filling it with water, and the air chamber of the elevated lock is connected with the loaded air tank, or pneumatic accumulator, which automatically compensates for variations in the temperature or density of the adjacent atmosphere, and also supplies such small leakage as is unavoidable. The gates of the depressed lock are then opened and its buoyancy is increased so that it will float with just the desired depth of water with which it should rise.

"The joint is then made between the elevated lock and the aqueduct face, and the space between the adjacent gates in lock and aqueduct is filled with water and the gates opened. The boat which has been raised is then swelled out into the aqueduct or upper level, and the boat which is to descend is swelled into the lock, which at the same time is lowered and takes on the surcharge or greater draught of water, which is the moving power of the system.

"This invention substitutes steel for masonry and timber in lock structures, and renders feasible the building of canals with long levels and very high lift locks, few in number and causing little detention. Therefore it renders canals practicable in dry countries and over mountain ranges.

"These locks give the engineer great freedom in planning his canal levels and do away with the waste of water as the canal bottom can be put down low enough to provide draught at the lowest water, and the banks carried high enough to hold the highest water."

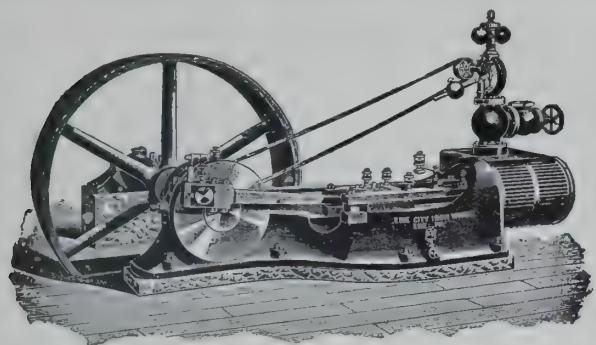
### A Track-Surfacing Machine.

THE roadbeds of the railroads of the United States require an army of 200,000 men constantly at work to keep them in repair. The importance of this work may be judged from the fact that these men have about 580,000,000 ties to look after, and their labor alone costs the railroads nearly \$70,000,000 a year. These are the section men. Approximately, there is one section man employed for each mile of track.

A generation ago, when the heaviest locomotives did not weigh more than fifty tons and a freight car load was ten tons, a good dirt roadbed sufficed. To day, with 110-ton locomotives tearing over the roads at sixty miles or more an hour, with trains of Pullman cars or hauling freight cars with loads of from 60,000 to 80,000 pounds each, the strain on the track and roadbed is something which an old railroader never thought of. One hundred-pound steel rails have replaced the old iron fifty-six-pound rails, stone roadbeds have replaced those of dirt, and ties are put only about half as far apart as they used to be. With all these improvements section men are constantly at work keeping the track in proper shape. Where the depressions are found the rails are raised by forcing earth or broken stone under the ties with tamping irons. This method is crude, and there are many objections to it. One of them is that it involves the breaking up of the bed of each tie disturbed. Now an inventor comes forward who proposes to do the work with compressed air. He says he can do the work so much more expeditiously that a saving of more than \$10,000,000 worth of time can be effected every year.

The machine consists of a Root blower, driven at the rate of perhaps 800 revolutions a minute. It is set on top of one rail, and has two small wheels on which it can be trundled along the rail like a wheelbarrow. When it is to be used a lever clips it fast to the rail. Attached to it is a hose about twelve feet long, ending in a metal feeder for the broken stone, which has a hopper at the top, where the stone or other suitable ballasting material is shovelled in, and a bent end at the bottom, which is put under the ties to direct the stream of filling. In using it none of the ballast between the ties need be removed. A shovelful is removed at one end of the raised tie until the bent end of the hopper tube can be poked under, and then the filling material is blown in and packed tight by the machine. Experimental machines were kept at work nearly all Summer, sometimes on the Hudson River Railroad tracks and sometimes on those of the New York, New Haven and Hartford line. As a practical result, the reports say that a progress of about 8½ feet an hour can be made for each man employed, while the railroad text books say that by the ordinary methods from 2½ to 4 feet an hour is the best that can be done. In placing new ties it is claimed that its work is equally ahead of the older method.





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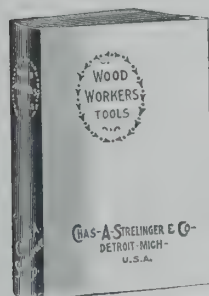
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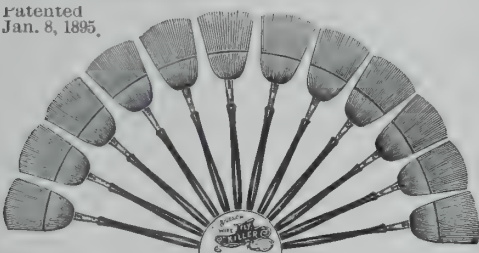
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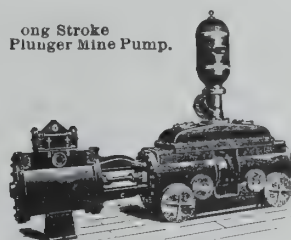
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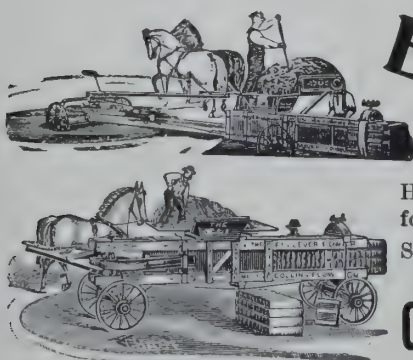
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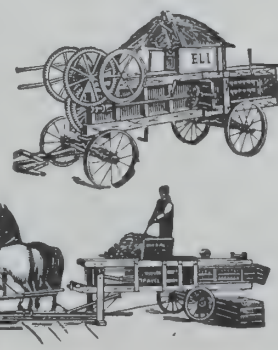
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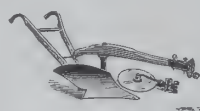


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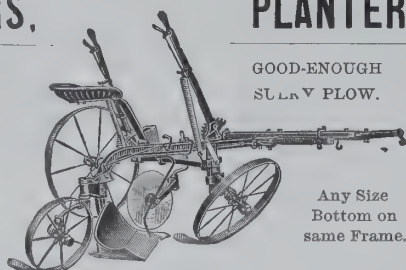
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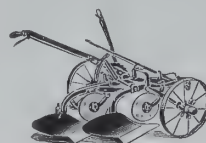


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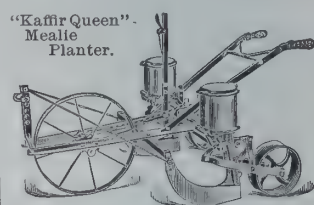


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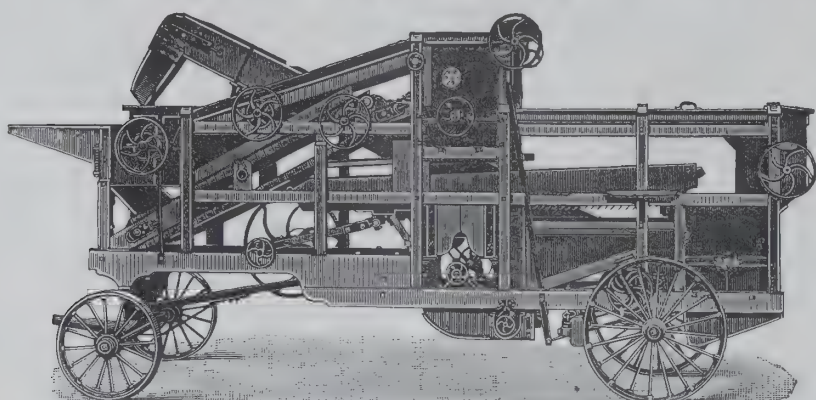
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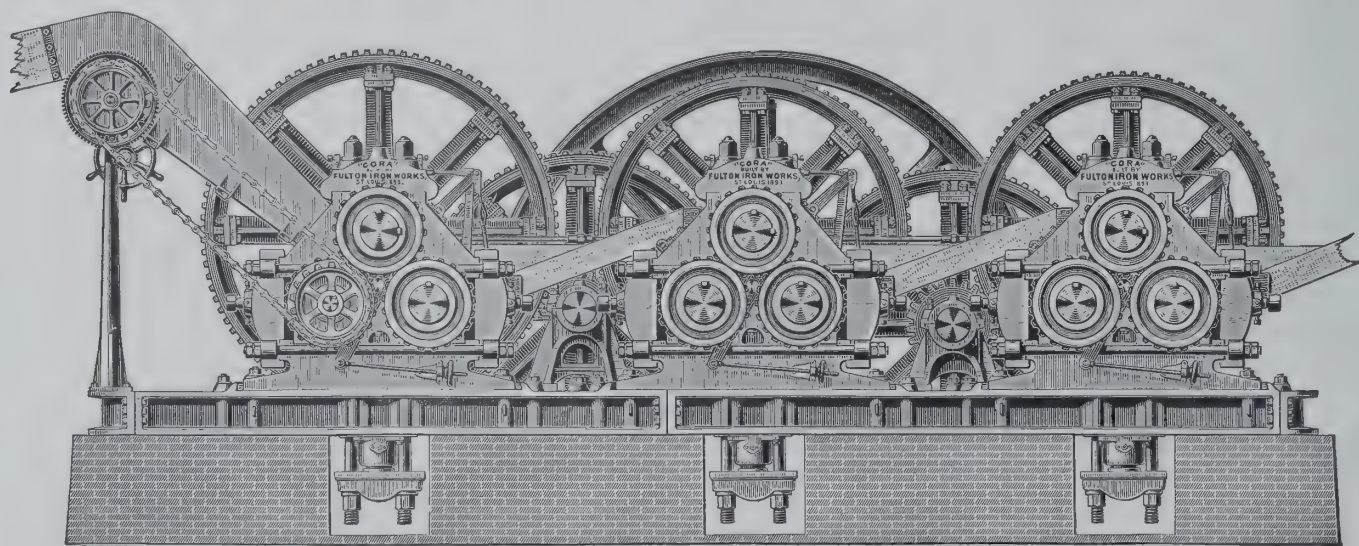
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Per S.S. "COPTIC."

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs; The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

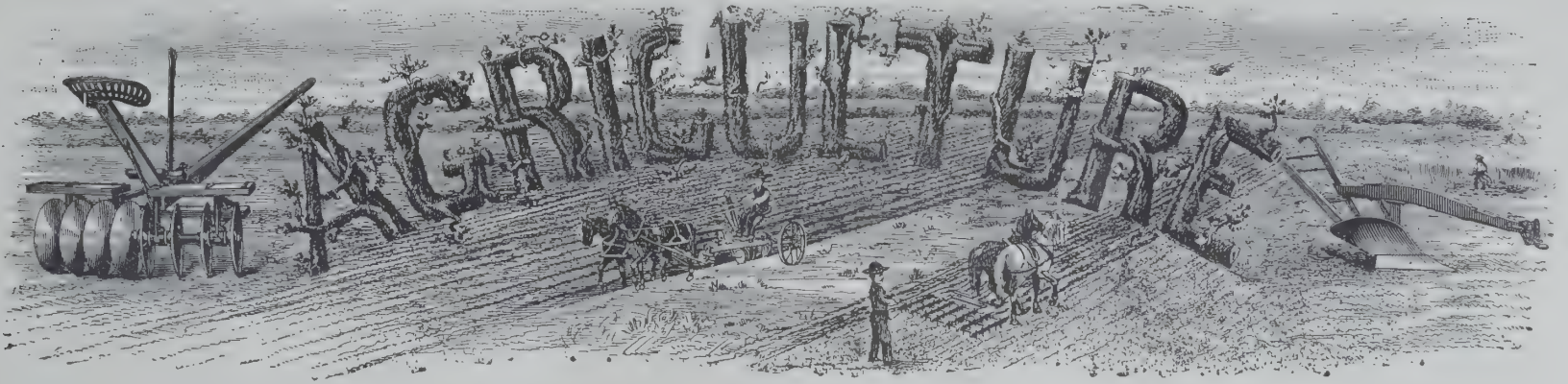
It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

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### Corn Harvesters, Huskers and Shredders.

A CORRESPONDENT of the *Farm Implement News* who has had considerable experience in the use of corn harvesters and of huskers and shredders, furnishes the following statement and observations:

"I give you the cost of husking and cribbing eight acres of corn in the old way as compared with the cost and saving by cutting and binding and husking and shredding—using one of the new small-sized shredders—and I make the calculations on eight acres because that is a day's work for the corn harvester or binder.

"Husking and cribbing eight acres require man and team eight days, which is equal to man sixteen days (counting team and rig as equal to a man).

"Cutting, binding, bunching and shocking eight acres with harvester take four men and three horses one day, which is equivalent to five and one-half days of a man. Drawing from the field, husking, shredding, mowing away fodder, and cribbing the corn require the work of ten men and four teams or fourteen days' work. Adding to this the five and one-half days for harvesting and we have nineteen and one half days, or three and one-half days more labor than for ordinary husking and cribbing. Extra cost for the new way will be:

Three and one half days at \$1.25.....	\$4 37
Twine for eight acres.....	2.00
Fuel for engine.....	1.00
Wear and tear on harvester, husker and engine.....	8.00
	<hr/> \$15.37

"The value of the shredded fodder on eight acres of good average corn, which should yield twelve tons at \$5 per ton, is \$60. The value of the stalks, as left in the field after husking by hand, is not more than \$8. Deducting this from \$60 we have \$52 and taking therefrom the extra expense \$15.37 we have \$36.63. Next throw in \$6.63 for stoppages and breaks on machinery and there will be \$30 clean gain on eight acres of corn handled in the modern way.

"As to quality of work: The harvesters now in the field, in good standing corn, break off about as many ears and leave them on the ground as careless huskers miss or drop while husking and cribbing. But the machine ought to be made or improved so as to do better and cleaner work than the ordinarily careful husker. The present machine cannot pick up down corn anything like as well as a grain harvester picks up down grain and whether they can ever be made to do it as well is a question, though possibly they can be sufficiently improved to do equally as good work in this respect. On the other hand, husking down corn in the old way is slow and tiresome work.

"A husker and shredder should both cut and shred the fodder, so as to make it easy for the cattle to eat and not leave it stringy, and it should fan and sack the corn that gets shelled off in the process of husking. The corn harvester also needs considerable improvement and no doubt we will get what is wanted in time, as I have already said. The usefulness of these machines and the saving they can accomplish have been so well demonstrated that invention will not rest until they are made to do satisfactory work under all reasonable conditions or until other machines are invented that will answer their purpose better."

### Apples from Western States.

BY reason of a shortage of the crop in the Eastern part of the United States and Canada English buyers of apples have been in Kansas and Missouri making some large contracts for the shipment of the fruit to Manchester and other English centres of population where the demand is large. It has been found that apples can be shipped to Liverpool cheaper from Kansas City than from many Eastern points and indications are that a large Western trade will be built up in consequence. Inasmuch as Washington State can ship apples with a profit to territory contiguous to Kansas City it would appear that the English trade also offers a new market for fruit growers in this State. It is well known that no finer apples are grown in the country than in the West. With proper packing they can be shipped to any part of the world and arrive at their destination in sound condition. The English buyers say that they never knew until this season that apples could be purchased so cheaply in the West and had supposed that the production was chiefly limited to the Eastern States. They were recommended to try Missouri and have done so. They are purchasing for the most part Ben Davis, Wine Saps and Willow Twig apples, there being the largest demand for these varieties in England.

### Farm Machinery in Russia.

SINCE the Russian Government decided to abolish the duties on agricultural machinery and implements, considerable effort, it is said, is being made by several manufacturers in that line to materially increase their Russian business, even though it may be done through foreign representation. This move on the part of the Russian Government cannot be but of the greatest interest to the American manufacturers. Parties in the trade claim that the American manufacturers are bound to increase their Russian business if the undertaking is properly handled.

The duty, which was formerly 70 copecks (about 49 cents) per Russian pound (equal to 36 pounds), was reduced some time ago at 50 copecks (about 36 cents) per pound. Since June last a committee appointed by the Imperial Minister of Finances to examine the question of duty held several sittings and examined many witnesses on the subject, and, as was to be expected, the greatest opposition to any modification or removal of the existing duties was displayed by native makers, although the great majority of land proprietors were making every effort to abolish the duty.

Since the United States has become such a formidable competitor in flour on the international market, the Russian people engaged in agricultural pursuits have endeavored in every way possible to improve their farm equipment, recognizing this as the only way possible of keeping pace with their foreign rivals. Agriculture has been and will be one of the chief industries of this vast empire, as may be seen from the following figures, relating to the harvest of 1896, which was in every respect below the average: Wheat, 14,577,480,000 lbs; rye, 41,807,240,000 lbs; oats, 33,687,720,000 lbs; barley, 10,118,880,000 lbs; buckwheat, 2,526,480,000 lbs; millet, 3,785,400,000 lbs; Indian corn, 783,000,000 lbs.

Although a large quantity of agricultural machinery and implements is manufactured in the country, the imports are yearly increasing. The total imports of agricultural machines and implements into Russia amounted in 1892 to \$2,010,123; 1893, \$2,495,045; 1894, \$3,635,800; 1895, \$3,850,120; 1896, \$3,710,000. To this the United States contributed in 1892 the amount of \$107,268; 1893, \$284,665; 1894, \$271,190; 1895, \$699,353; and 1896, \$457,622.

It will be seen that the American share in this trade is insignificant to anyone who realizes the possibilities of extension. Manufacturers, however, should take more care in securing proper foreign patents, so that the imitation of machines would be impossible. This inattention on the subjects of foreign patents is costing American makers, it is said, millions of dollars, as not only do the foreign manufacturers pirate upon American ideas in goods not protected by patents abroad, but they infringe upon protected goods to an extent which calls for some united action from American manufacturers.—*New York Journal of Commerce and Commercial Bulletin*.

### A Good Fall Season.

IMPLEMENT dealers generally have experienced an excellent trade this season. The results have been highly satisfactory, especially in the more favored sections of the country, where the wheat crop was large. The dry weather had some effect on the trade, necessitating, as it did, the sowing of a somewhat decreased acreage of wheat. However, the loss that occurred from this source will be largely made up in the Spring, as the land will be planted in corn, oats or Spring wheat. Manufacturers have been exceptionally well pleased with the showing made this Fall in the implement line. After several years of dull business, where it took all the ingenuity and skill of the manufacturers to keep the business running, they are glad again to be able to report the balance on the correct side of the ledger. Buggy and wagon manufacturers have had an almost unprecedented demand for their goods. Drill men have also been highly pleased with the result. In fact, there is little reason for complaint on the part of anybody. All are busy now, preparing for the Spring business, which promises to be excellent.—*Farm Machinery*.

—An order for a quantity of California prunes, in sizes running from 40s to 90s, has been received from Trieste, Austria, by a New York firm. The fact is remarkable, in that Trieste was formerly the chief export market for European prunes, and from it in times past the United States drew the bulk of its supplies.



### Farm Implements in Smyrna.

THERE seems to be a movement in favor of more modern methods of farming in almost all parts of the world where agriculture forms any considerable part of the occupation of the inhabitants. The people are beginning to realize that they are living in an age when to succeed they must have all the labor-saving devices which will at the same time increase the production of the soil. It is reported that the farmers of Smyrna, in Asia Minor, are adopting to a very considerable extent the machinery used by their more enlightened brethren of other countries. The old wooden plow, drawn by oxen, while still used by some farmers, is fast being supplanted by the more modern plow, drawn by horses. Threshing and harvesting machinery is also coming into common use. Plows of American manufacture, selling at from thirty to forty francs, are common, and there are many mowers, but owing to the prices at which they sell they are not in such common use. American manufacturers supply the bulk of the mowing machinery in use there. The French and English secure a portion of the trade, but it is comparatively small as compared with the business done by Americans.

It is certainly gratifying to Americans to note these improvements; it is more gratifying to know that they are securing a share of the business. With the expansion of trade in new territory the American manufacturers should be able to compete with all the world and secure fair returns for their offers.

### A Useful Implement.

AN inventor of South Carolina has perfected a machine which, according to report, is destined to play an important part in farming throughout the world. The machine is a tricycle set on a frame 3x6 feet, to which there is fixed a mower attachment measuring 5 feet. Its cut is clean, it has a free and easy movement and is of light draught. Other attachments may be used to sow all kinds of grain, wheat, flax, oats, corn and other cereals, and one as useful and unique as any is for cotton. There are four distinct parts to the cotton planter—one for opening the row, another for sowing the cotton by grain, an appliance for covering, and a roller to press the row, all of which is done simultaneously in one drive of the horses along the row. The machine also carries with it a most effective potato digger, as well as eight or more hoe drills, for drilling wheat, all of which are worked upon the same frame, drawn by two horses. The cotton chopper should also be mentioned. It revolutionizes the cotton chopping business on the plantations at the South.

### The Latest Submarine Boat.

THE trials of the Raddatz submarine boat in the Fox River and Lake Winnebago have practically demonstrated its utility. Mr. Raddatz has been experimenting with the vessel for eight years, and three years ago had about completed his task when financial stress overtook the country and delayed his work.

The submarine boat looks as though it would be equal to any reasonable demands that might be made upon it. Everything about it indicates that it is essentially a man-of-war, its steel prow being capable, it is asserted, of piercing the sides of any cruiser afloat. From the outside the boat looks like a huge cigar. It is 65 feet long, 4 feet wide and 7½ feet in depth. Its weight is 31 tons. It is built of steel plates, closely fitted over a heavy framework of iron, and the inventor estimates that it can withstand the pressure of the water to a depth of 500 feet. The entrance is through the turret, which is 2 feet high and furnishes the only exit or entrance.

The closing of the manhole of the turret and the descent into the water causes novel sensations at first, yet a trip lasting more than an hour, with a submersion varying from 10 to 20 feet, furnished no unpleasant experiences. The air in the boat at the end of this period was as pure as at first. Mr. Raddatz keeps his process of furnishing air a profound secret. The boat inside is 4 feet in diameter at its widest point, making it impossible for a man to stand upright save in the turret. Here are fitted several bull's-eyes with strong lenses for exploration. When the last trip was made, however, it was a cloudy day, and the waters of the lake were muddy, so observations were not satisfactory.

There are two sets of machinery for propelling purposes, a hot air engine of nearly 30 horse-power for use on the surface, and an electric motor for the submarine voyages. Immediately under the turret is a steering wheel, like the wheel of a small yacht. Mr. Raddatz, in operating the boat, sits under and slightly to the rear of the front turret, holding the steering wheel with his right hand, while with his left hand he controls the starting button on the left, a small knob that starts the motor. Two gauges to register the voltage and amperage are on the right hand, and an automatic machine has been provided to prevent the submersion of the boat beyond the depth desired.

There are several batteries, and if one breaks down others can be quickly put in to take its place. The battery cells are in the sides of the boat, and connected with them is one of the most ingenious devices of the inventor. When the cells become exhausted the motor used for propelling under water is reversed and run as a dynamo, and they are recharged. In the stern of the boat is a hot-air engine, like the pumping engines used in factories, connected with the propeller shaft. A storage battery of 30 cells is also near the engine.

All the valve gears are inside the turret, within easy reach of the pilot, and all the machinery that operates this craft is easily managed by one man, the boat obeying him with the utmost readiness. The turret is only 2 feet in diameter, and holds only one person at a time. The boat accommodates only about four persons comfortably, although six might be stowed away in her.

The motion of the boat in the water is so even that it is almost imperceptible. This is due to the fact that resistance is reduced almost to nothing by the shape of the boat and the smooth action of the machinery. The spirit level on our trip showed almost no variation from the first. The only time motion observed was in the descent, and then it was merely a gentle decline. The craft can be turned easily under water, round and round, and can be raised and lowered without shock, rolling or jolting. Mr. Raddatz can raise and lower it 3 feet per second. On the surface, with merely her turret projecting, it has made trips at the rate of 14 miles an hour, and, submerged, at 10 miles.

The lighting of the boat is electric and is satisfactory. A wire loop on the dynamo has three incandescent bulbs. The air, which is mixed on the boat, is in storage chambers underneath the board flooring. Mr. Raddatz states that he kept it pure by chemical generation of oxygen absorbing the carbonic acid gas in caustic potash, caustic soda and lime. The temperature of the boat is kept uniformly at about 50 degrees. No heating apparatus has been introduced yet, although in the future electricity will furnish all necessary warmth.

### Combined Grain and Corn Harvester.

A COMBINED grain and corn harvester has been perfected by an Ohio inventor which showed very satisfactory results at a recent test. It is reported that the harvester was worked in a field of dead ripe corn, the stalks and blades being very dry, and that the machine did perfect work, cutting, elevating and binding the corn and carrying the bundles as on the ordinary grain binder. The machine is a new combination embracing an open-end elevator, grain harvester and binder, constructed with increased cutting and elevating capacity and with a special attachment to be used instead of the grain-cutter bar and divider for gathering and cutting corn. The corn is cut, elevated and bound and the bundles carried into shock rows, just as crops of wheat, rye or oats are harvested with the ordinary grain binders.

### Cleaning Structural Iron by Sand Blast.

THE city of New York is now trying the experiment of cleaning structural steel by the sand blast. The 155th street viaduct is a steel structure and is used as a roadway with walks on each side. It suspends from Washington Heights across the Harlem River. At about the middle of the viaduct is the terminal of the Manhattan Elevated Railroad, and at this point there are almost continually one or more locomotives which throw out smoke and gases that ascend upward and radiate in the maze of trusses above. The effect of this has been to quickly destroy the paints that have been applied and to leave the surface of the metal exposed to the weather, and a consequent rapid deterioration from corrosion. Four coats of paint have been applied in five years and the necessity of doing something to protect the structure led to the experiment. The makers of the best paints are applying their best products side by side under equal conditions. The metal structure is cleaned in advance by the sand blast. The apparatus employed consists of two air compressors and a Ward & Nash improved sand-blast apparatus of three mixers.

The free air delivered is nearly 400 cubic feet per minute, the pressure being maintained at about 20 pounds. The air is conveyed about 300 feet to an air receiver which stands near the sand-mixing apparatus. The sand is thrown in the hopper at top and it finds its way down to the bottom of the mixer, where it meets the air and the two commingled flow through a 1½-inch rubber hose and is delivered through a cast-iron nozzle with a hole 9/16 inch diameter. The sand and air pass through this tube at a velocity of over ten miles an hour. The operator holds the nozzle close to the surface to be cleaned and flying sand striking the scale and the paint which still adheres loosens and finally cuts it completely away, leaving the metal as innocent of covering as the moment it came from the foundry. It is absolutely and thoroughly cleaned. The metal now presents a perfect surface for painting, and painters begin work of painting every day at three o'clock in the afternoon, the earlier part of the day having been consumed by the cleaners. Two nozzles are kept at work at the viaduct. Combined they are able to clean 700 to 800 square feet per day. There is a man for each nozzle, an engineer for the compressors and several men to carry sand and sweep and carry away refuse. Twelve tons of scale were taken off of the structure by means of a clean air blast before the sand was used.

It is assumed that this thorough and careful process of cleaning will so prepare the metal that the paint will now be firmly set when applied, and that it will fulfill its mission of preservation.—*Age of Steel.*

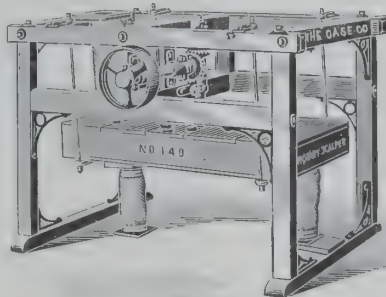
A FEW weeks ago the steamship *Persia* of the Hamburg-American line sailed from New York with one of the most notable consignments of trotting horses that has ever been exported. It was a lot bought in Syracuse by W. Schlessinger, a dealer of Vienna, and is but the first of other notable shipments that will follow shortly. There were in all some twenty-five horses, including some famous racers whose records on the turf have given them a world-wide reputation.

—The London *Fruit Grower* recently contained a very complimentary article on California pears, expressing surprise that such fine fruit should be brought from so great a distance. The opinion was also expressed that in the near future the California pear trade in London would eclipse the French pear trade altogether.



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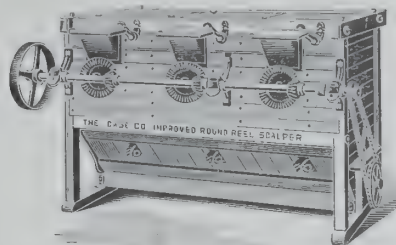


ROTARY SWING SCALPER.

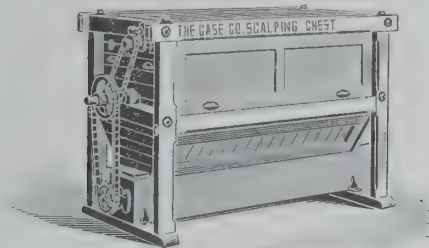
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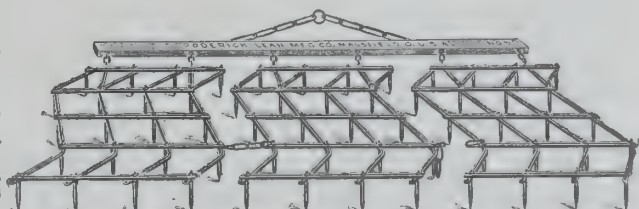
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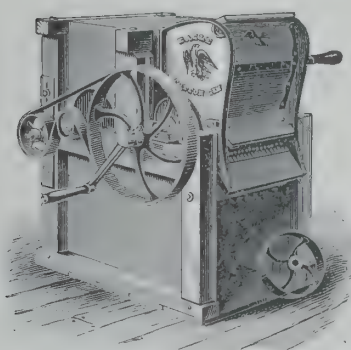
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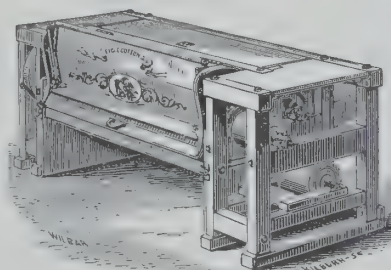
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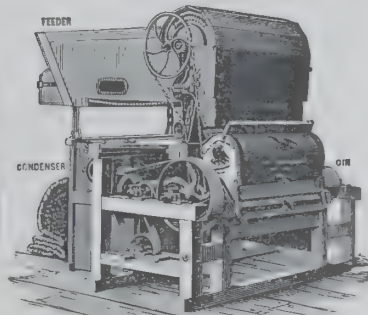


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## ELECTRICAL NEWS.

### Latest System of Surface Contact.

LARGELY on account of its unsightly features, the trolley line, so popular in America, is practically prohibited by the municipal authorities of the European cities. A variety of motive forces is resorted to, but the authorities on railroad matters have agreed that surface-contact system would be the ideal, but it is only now that it has been perfected.

A certain form of an American company, which has been tried experimentally and found successful, is to be adopted on a three-mile stretch at Monte Carlo, in the province of Monaco.

Even the most sanguine champions of the storage battery have been forced to abandon it as a motive power for street railways, except where other systems are prohibited, and the underground electric system (that is, where the trolley or conducting wire, is carried in a slotted conduit), which has been occasionally adopted as a substitute, presents many obstacles to economical operation. A surface contact system combines the cheapness of operation of the trolley without any of the objectionable features of a network of overhead wires and undesirable trolley poles, so that the news that a perfect system of surface contact had been devised in America and will soon be in active operation in Europe has simplified the whole problem of surface street railroading.

The main requirements of a surface-contact system are four: low cost of installation and maintenance, absolute freedom from leakage, a dead system when the car is not covering the discs, and reliability under all conditions of weather. In this system a series of contact buttons or discs, practically flush with the surface, are arranged along the inside of the track, and with these a shoe carried by the car makes a sliding contact. There are two rows of discs, one representing the positive side of the circuit, and the other the negative side. The discs are wired in such a manner that this long shoe in passing over them completes the circuit of the windings of certain electro-magnets connected in circuit with them, which are thereby energized, attracting their armatures. The movements of these armatures in turn complete the circuit of the motors, placing them in electrical connection with the feeding wires buried in closed conduits in the street. In order that the car may be started, however, it is necessary that the magnet connected with the discs then in contact with the shoe should be energized by current from a circuit separate and distinct from the power circuit, but after the first magnet has attracted its armature the action is automatic, no matter what the speed of the car. To obtain this action a storage battery of a few cells is carried on the car and connected with the controller in such a way that the movement of the handle to the first notch energizes the magnet, and movement to the second notch places the motors in the power circuit. When the car is running the batteries are being constantly charged. As soon as the car passes over a disc it becomes dead, or disconnected from the power circuit by the falling of the magnet armature by gravity.

In order that an arc may not be maintained between the armature and magnet poles, provision is made for blowing it out on the well-known magnetic blow-out principle. One of the essential features of the system is the grouping of a number of the electro-magnets, say twenty or more, in a vault or manhole at intervals along the road, so that access can readily be had to them, and for their better preservation than would be possible in the necessarily small box or receptacle that would be used if each electro-magnet was protected individually.

### Another Incandescent Lamp Regulator.

A STILL greater improvement in regulating devices for incandescent lamps or alternating circuits has lately been perfected. The device is in the socket of the lamp, which is made of porcelain, and by its means an incandescent lamp can be readily turned up or down like an ordinary gas jet and be made to burn at any desired degree of brilliancy, from a barely perceptible glow consuming but one-tenth of the normal current up to full candle power of the lamp.

The socket consists simply of a coil wound in a novel way around the core. Each core has a complete magnetic circuit, giving a very economical socket, and produces a kicking effect on the main circuit, thereby reducing the voltage of the lamp and effecting a saving in proportion to the light.

The socket, which, by the way, has no wasteful resistance to consume the current, is adapted to lamps of any voltage and candle power within its range, and thus places the incandescent lamp on a par with gas. It appears to afford the consumer a successful, practical and economical method of controlling the amount of light given by the lamp and should effect a material saving both in the cost of the current and in the life of the lamps. The invention will likely aid materially in enlarging the already extensive field of domestic electric lighting.

### Electric Locomotives.

THE Ballston Terminal Railway Company, of Ballston Spa, N. Y., are having equipped for service four locomotives, to be operated by four 50-horse-power standard railway motors, mounted on the axles of the locomotive trucks. By this method the total weight of the locomotive is utilized for traction, each wheel being a driving wheel. The total weight of the train is estimated at 165 tons, the total weight of the locomotive being thirty tons.

The total attractive force or draw-bar pull of the locomotive will be 11,500 pounds, at 8.5 miles per hour; that is to say, it will be capable of moving a train of 165 tons at 8.5 miles per hour up a 2.5 per cent. grade. The total length of the locomotive is 46 feet 6 inches.

### Electricity Outpoints Steam.

AT the recent annual meeting of the American Society of Mechanical Engineers papers were read by W. B. T. Whaley, of Columbia, S. C., on "Electricity in Cotton Mills," and by W. J. Keep, of Detroit, on "Cast Iron Under Impact." Mr. Whaley told of some comparative tests which were made of two mills of nearly equal size, in one of which the spindles and looms were run by steam and the other equipped with 150 horse-power electric motors. One notable advantage which the latter mill had because of its electric equipment was that it required only about 122,000 pounds of shafting to make its connections, as against about 136,000 pounds for the steam mill. The steam mill required more oil and other items of running cost, while in six months the other mill did not require a cent for repairs to the motor. The electric mill could be operated in parts also without running all the shafting. The test showed that there was a saving in friction in the electric mill of 77 horse power.

Curious effects were shown by the tests of cast iron under impact, as described by Mr. Keep. Each test bar was subjected either to blows by light hammers, delivered on its ends or sides, by dropping them about three inches endwise upon an anvil, tumbling them about in a tumbling barrel or by having them shaken up in railroad cars. It was found that blows delivered on the sides and ends of the test bars both decreased their length. Ten blows with a half-pound hammer on the side of a test bar one half inch square and a foot long made the bar shorter the .0001 of an inch. Tumbling in a barrel also shortened them. Hitting the bars on the ends also shortened them.

"If further experiment should show that the casting becomes shorter when struck with a hammer," Mr. Keep said, "it will in part explain the frequent cracking of a casting by rapping off the gates."

### A Modern Kitchen.

AN electric illuminating company of New York has arranged at one of its stations a complete electrical kitchen, which is presided over by a skilled chef, who serves electrically-cooked luncheons for the officials and heads of departments of the company. This is, of course, largely done with a view of illustrating the practicability of the electric system of cooking.

The electric ovens are brought to the desired heat in a very short time, and a uniform degree or temperature is easily maintained, so that the cooking process requires less time than by the ordinary heat direct from coal. For boiling vegetables, sauces, etc., special stew-pans and pots are utilized, which are attached by means of a plug to the circuits and are operated independently, so that as varied a menu as may be desired can be prepared by merely attaching broilers and kettles to the service circuits. The kitchen is fitted with stone slabs for the cook's work, a white tiled sink with hot and cold water, and in the corner, standing close against the largest piece of cooking apparatus, the electric ovens, is the refrigerator, the radiation of heat being so slight as not to affect the ice in close proximity. "This beats my old coal kitchen, for I have no ashes nor dirt, and when the heat is wanted it is there. It cooks in two-thirds the time that would be needed in an ordinary stove," said the chef. "I can bake a loaf of bread in sixteen minutes, a pie in nine minutes and biscuits in four minutes;" and he added, "your fire won't die down so that you must put fresh coal on, which deadens it for a spell and then gives too much heat."

The current for electrical cooking at consumers' rates costs slightly more than fuel for coal stoves, but economy lies in the fact that work is done in less time with the current, and that the heat is generated only when desired for service, ceasing the instant it is turned off; it has also apparent advantages in the way of cleanliness and ease of management.

### A Powerful Electrical Apparatus.

FOR the past two years Prof. Trowbridge, director of the Jefferson Physical Laboratory of Harvard has been at work perfecting a battery for electrical discharges. It is now the most powerful apparatus of its kind in the world and has already been used in several investigations of the X-ray. It is the only battery strong enough to send a discharge through an X ray tube; all other batteries send the spark around the tube. It has been used repeatedly to show the skeleton of the hand.

An idea of its power can be had from the fact that it has a voltage of 1,200,000, and the voltage required to run an electric car is only 500. This instrument can evolve a spark fifty inches in length, and in doing so gives a loud report like lightning.

Prof. Trowbridge has lately been able to prove by this apparatus that the length of the spark is accurately proportional to the voltage. This fact, which has long been doubted by various German scientists, can be used to ascertain the voltage required to send a flash of lightning a given distance.

### Expanded Metal for Pavements.

IN San Francisco, Cal., a paving material consisting of steel and concrete in combination is being laid in some of the principal streets, which is expected to give the best results. Expanded metal is the form in which the steel is used. The earth of the street is then graded into shape and covered with a bed of sand. On this sand is laid the sheet of expanded steel. Over the steel is then laid a layer of concrete. The concrete is stamped into the meshes of the metal, forming a perfect bond. This makes a foundation that will never give way. Upon it can be laid asphalt, bituminous rock, basalt blocks, wood blocks, brick or any kind of surface pavement desired, the permanency of the entire pavement depending entirely upon the character of the top work.

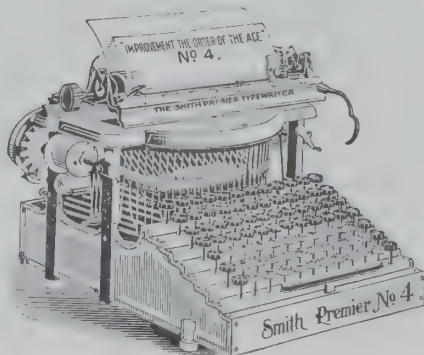


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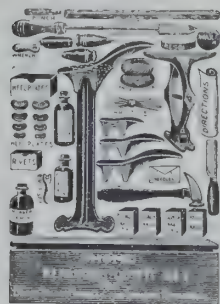
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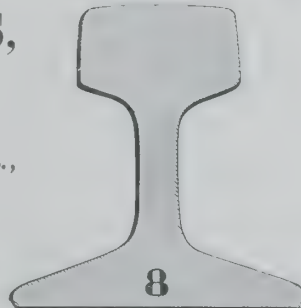
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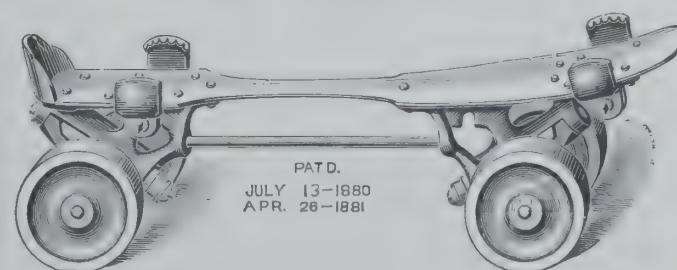
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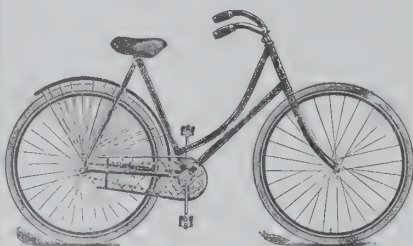
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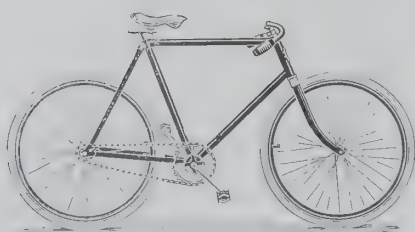
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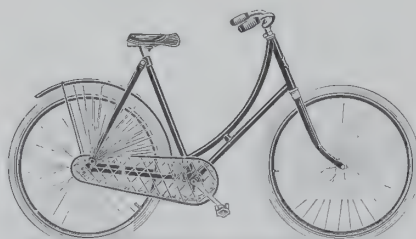
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Tribune Model 33. Price, \$50.00.

Model 33 is a bicycle of excellent quality and finish, and far superior to many machines listing at higher price. The frame is weldless steel tubing of best quality, built in two heights, 23 and 25 inches; wheels, 28 inches diameter; gear, 73; cranks, 7 inches. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, gold striped, nickel trimming. Weight, about 23 1/2 lbs.

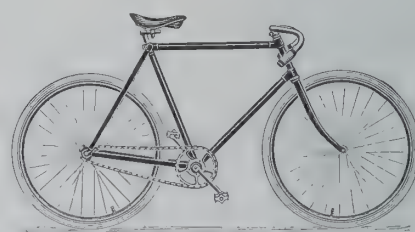
**ARENA MODEL M.** Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 34. Price, \$50.00.

Model 34 is practically the same as Model 33, excepting that it is built with drop frame, 20 1/2 or 22 1/2 inches, for ladies' use. Weight, about 24 1/2 lbs.

**ARENA MODEL L** is very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.

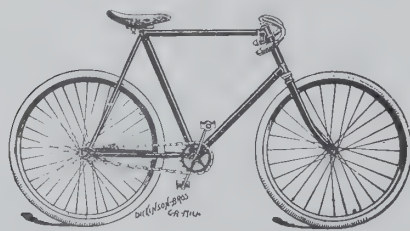


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Model 350 is built for road racing and for all purposes where a light wheel is desired. The frame is built in 23-inch height only. Drop to hanger, 2 1/2 inches; 7-inch cranks; Tribune special single-tube racing tires. Weight, about 21 lbs. Finish, black, gold striped.

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### Some New Models.

It happens almost every week now that some new design of cycle more or less revolutionary in idea is sprung upon the market. Wonderful and ingenious designs of chain and chainless wheels never before seen or thought of are cropping up in all directions and mechanics are still talking about many more startling promises for the advent of 1898, so it would appear that the end is not yet.

Inventiveness in cycles and cycle improvements has been prolific enough for several years past, but of late it has been stimulated beyond all conservatism by the cry of the trade for some radical departure which should induce riders again to follow as a habit the purchase of a new wheel every season, and therefore enable manufacturers to maintain a high list price for "new models."

It is interesting to speculate on what form the cycle of the future will assume, what the character of its driving mechanism will be and what its speed possibilities. Will the popular pattern of the next decade have a diamond frame, quadrangular, circular or triangular? will it be bevel geared, chain driven or be fitted with some style of spur wheels, cables, cams or eccentric rods? will it so economize friction in the transmission of power that it can be ridden faster and further without any more fatigue? The efforts being made to solve the situation, as illustrated by the new devices now appearing, are full of suggestion for those who speculate upon these questions. Certain it is that those who seek change and care to do their own experimenting will have abundant material from which to choose.

Many more makers than were at first supposed will put out bevel-gear wheels, while many others, who a month ago had not declared their intentions, will manufacture, in greater or less quantity, some pattern of cycle showing an absolute departure. Even those who claim not to believe in this revolutionary movement and who still argue that a chain transmission, properly protected, is ideal, are experimenting in directions now leading away from the type now common on the roads. Generally speaking, it may be expected that every manufacturer of prominence will produce some sort of novelty for 1898. Many will undoubtedly be regarded as "freaks," but riders should not forget that a "freak" is simply a device so new that it looks queer and that the "freak" of to-day may be the prevailing pattern of the future.

One Ohio maker has brought out a so called chainless in which are employed twin driving rods acting similarly as on a locomotive. The most peculiar point in connection with it is that a short chain is employed between two ordinary sprockets before the power is given to driving rods for transmission. Externally viewed only the rods and an oval shaped box at the crank hanger are seen. Within the box, fixed centrally on the crank axle, is a sprocket of the usual size used in front, while behind is a smaller sprocket, the axle centre of which is just  $3\frac{1}{2}$  inches from that of the larger sprocket. A chain runs between these, and it is the axle of the smaller sprocket in the rear that actuates the driving rods. Outside the box a small lever arm is attached to either end of this secondary sprocket axle and the rods are fulcrumed to this arm on ball bearings. At the axle of the rear wheel the attachment of the driving rods is the same. This machine runs smoothly and silently and the rear wheel balances prettily. A strange fact in connection with it is that the maker of it has produced quite a number of them for export during 1897, but will offer them on the American market now for the first time.

A spur gear wheel having three connecting sprockets in mutual alignment is being turned out in a small way by a Philadelphia concern. This is a cycle which has been confused with one having three spur tooth sprockets, made by a New York firm, but it is wholly different. In the Quaker City product the two forward sprockets are of the same size, and the second or middle one revolves on an axle of its own instead of having only its rim revolve on bearings, as is the case with the other. A point of virtue in this device is an ingeniously placed brace, running triangularly across the rear forks to the back stays so as to give greater rigidity to the rear part of the frame.

An entirely new chainless, but one which embodies some ideas not wholly new, has been perfected and is now being ridden by its inventor. He calls it an "internal cog gear," because the cogs cut on the rear axle engage with driving cogs on the inner surface of a sprocket ring, and thus the teeth are travel-

ling the same way instead of in opposite directions, as in the case of the spur gear just mentioned. The outside sprocket, having the power teeth on its inner surface, is attached to a lever by means of a fulcrum arm. The motion of the pedals is up and down, one being raised when the other is lowered.

A frame of curious lines, and one to which any lines can be given, is on the market as an adjustable frame. Every joint is bolted and it can be altered in height or in almost any way conceivable, including from a man's to a woman's style of frame. This wheel is shown fitted with a new kind of gear case, consisting of an elastic rubber trough stretched snugly over the chain and running around with it.

Something altogether novel in appearance has resulted from the working of a New Yorker on the idea of having the rider's weight distributed more equitably throughout the frame and having also the shock taken up and directed toward the axles, so as to relieve the rider from jar. This is accomplished without the aid of springs, through geometrical calculations. The top bar of the wheel is tangential, with a curved tube running from the head to the top of the strut, and, being countersunk, distributes the weight from the centre of this curved tube to the front and rear wheels, thus relieving the crank hanger and throwing the weight on the front and rear axles, with more on the front axle than is now common. From front to rear axle the main lines of this wheel resemble an arch.

A combination of chain and cog gearing has been tried in England and used there considerably, and 1898 will witness the appearance of a similar contrivance made in Indiana. The chain runs from front to rear as in the regular chain-driven wheel, but the power from the cranks is transmitted to the front sprocket by means of internal cogs.

Neither chain, cogs nor cams are being used by a Westerner now completing a new model for 1898. This man thinks the worm principle the best thing. A front and rear sprocket have a series of short worms cut on their surfaces, not unlike an auger groove, and these engage with a revolving rod with counter worms running from front to rear.

Next year will find several inventors at work on the perfection and launching of a triangular frame on which the saddle is at the apex. Mechanically there is everything in favor of this construction, but there are several difficulties of construction in making it convenient for riders and easily controlled.

At least two firms are producing wheels working on a friction-roller plan, having an eccentric rod pivoted at the centre, with an eye at each end, within which eyes or loops the front crank and an arm on the rear axle plate revolve.

Out in Michigan a man has made a queer-looking gear, having arms extending from the rear axle to a front sprocket. The arms have hooks at the forward end, which engage with the teeth, and by means of a roller action on the teeth the rods receive a small elliptical throw.

Besides those mentioned there will be pneumatic wheels, in which the crank action stores up compressed air; hydraulic cycles, which are charged before starting so as to make hill climbing easy, and various devices of which little is likely to be seen beyond a single sample.

The variation in bevel gear wheels will be considerably more than riders might expect from hearing that many makers will work under the same patents. The licence-paying manufacturers, however, have contrived to put considerable originality into their methods of connecting the driving rods at the front and rear and also in adapting the frame and bearings to the gear.

Novelties will by no means be confined to cycles proper during next season, and those who seek them are likely to find as many "freaks" in saddles, tires, brakes, etc., as in frames and gearing. Another brake has just been brought from San Francisco for introduction in this market. The makers are among the largest manufacturers in the country. When the thumbs press the handle-piece above and behind the bars the perpendicular rod, through a hinge action, is forced downward, and the hemispheric rollers, which are fixed in the position of an inverted V, clasp the sides of the tire. The rollers are rubber covered. This brake seems to find much favor.

—A contract from Holland for \$400,000 worth of bridge work to an American concern is a fresh indication of the expanding market for steel manufactures of the United States.



### Aluminum Bicycle Frames.

CAST aluminum bicycle frames have now been developed to a point where the public may readily be induced to make a comparison on one side between the usual steel construction and the new chainless construction, and, on the other, of the improved aluminum article cast under pressure, with fixed gear-case, all cast in one piece and enamelled in any color or left in its original metallic finish. The latter appears smoother and cleaner than the ordinary aluminum of commerce and is not so oily to the touch.

By the Crecelins process of casting aluminum, it is claimed, all the foreign and antagonistic gases, etc., are entirely eliminated from the metal during the process of casting, thereby rendering the casting nearly homogeneous and greatly increasing its strength. The molds made of malleable iron, are put into the furnace and heated to 1,600 degrees, and while this is being done the aluminum is being heated to 1,200 degrees in another furnace. When the mold reaches the required temperature it is withdrawn from the furnace and the molten metal poured into it. In each mold allowance is made at the "gate" for the shrinkage which is brought about artificially. If the metal were allowed to cool naturally, it is asserted, the casting would be valueless. After the mold, including the "gate," is thoroughly filled with metal it is subjected to a blast of cold air applied to the the thickest part of the casting. This causes a shrinkage of 5-16 of an inch to the foot. The cooling process takes four minutes for a bicycle frame or any reasonably sized casting. Aluminum castings made under the Crecelins process, it is claimed, possess double the strength of brass while weighing but one-third as much.

The reasonable cost and the extraordinary promptness with which bicycle frames by this process may be produced in quantity and with comparatively slight extra expense when changes must be introduced in the style and shape of the frames, make it principally a question of a real guarantee for the metal's trustiness whether these frames shall gain the confidence of the public.

The fact that the metal in its new compacted state receives enamel readily is believed to be due to the removal of the gases which by older processes remained in it in a more or less free condition, and it is expected that this new advantage will also open new channels of trade for its introduction, as it certainly makes it possible to give bicycles not only a more conventional appearance when that is desired, but broadens the variety of decorations and effects that may be used on them. The fixed gear-case attachment is another feature which is relied upon to jibe with the demands of the day, as it meets most of the objections to an uncovered chain which are at present being urged against the usual type of bicycles and in favor of chainless models, besides adding strength to the frame. The cast has a solid wall of aluminum  $\frac{1}{4}$  inch thick on the back and is cast with lugs connecting it with the seat pillar and the lower front rail in front and integral with the driving side of the upper rear forks to the rear. This part is of course slotted to receive the rear wheel axle adjustably. A detachable aluminum plate closes the open end of the back wall at the rear and is held with a single screw. The face of the case is closed with a celluloid plate with rubber-rolled edges, which fits exactly under the edges of the metal case and is held by two screws which enter into stubs projecting from the back wall.

### A New Timing Device.

WITH the increase of speed in bicycle racing, difference of opinion is beginning to exist as to whether the human eye is quick enough in detecting the order of finish in races that are closely contested. In fact, it is claimed where three or four riders finish inches apart in time under two minutes, it is next to impossible for any one, two or three persons to accurately name the order of finish. Complaints are made all over the country, and not infrequently is a man given first place when those who are given second, third or fourth feel that they should have been elected to the place of honor.

A thorough test of an electrical device has been made, and it is quite likely when completely perfected it will be invaluable in getting the correct positions of the men in a bicycle race even when it is won by inches.

The machine consists of a tape line, which is divided into segments. Each segment is electrically connected with a pencil located on a recording instrument in the judge's stand. A moving sheet of paper is lined by the pencils, and dashes, corresponding to the positions of riders at the finish, are automatically produced as the riders cross the tape. The time of the first man is also taken by the affair.

When the first rider, as well as the last, crosses the tape an electric circuit is formed, which, by the means of a suitable mechanism, causes the stop watch to be instantly stopped, while the pencil corresponding with the position of that rider raises itself from the moving paper.

### A Strong Wood Rim.

THE English trade has been slow to adopt the wood rims almost universal in America. One objection raised against them is that they are liable to break or give out at any time. As an effectual disclaimer to this rather popular fallacy, we were shown a photograph of a wood-rimmed American bicycle recently which had been run over by a heavy wagon. The forks were broken, the spokes were sundered, the hub was crushed, but the rim remained intact. The makers remarked with some pardonable pride that it takes a good rim to stand this test. Such a rim must be made on a scientific basis—any old barrel hoop will not do. The grain of wood in the process of bending is disrupted in ratio to its thickness. A wood rim, scientifically constructed of superimposed layers of proper proportional thickness, is the only rim that will stand such a test.

### A German Paper on American Competition.

GERMANY has felt rather keenly the effect of American competition in bicycles in her domestic market. So keenly in fact that the manufacturers even applied to the Government for protection in way of a special tax, a boon which the latter did not feel justified in granting. It was not altogether unnatural either that many of them should attempt to bring things their way by deprecating the machines of their competitors for which they have been somewhat severely taken to task by the *Kleine Journal*, Berlin, which commenting upon the extraordinary importation of American bicycles says:

"We would be the last to censure an industry for seeking to rid itself of a competitor, but the battle must be fought decently and honestly if the sympathy of the public is to be gained. We wish to direct a word of warning to the cycle manufacturers, and hope to do them more service than if we were to undertake an unskillful defense of German and unjustifiable depreciation of the foreign wheels. Injustice to the American could only hurt the German in the eyes of all fair minded persons. The German can learn a great deal from the American. The latter is much more enterprising, knowing that a single successful venture will pay for many failures, and many a good idea is executed in America while it would have been forgotten here because German capitalists fear risk. We can learn something by examining the mistakes of the Americans, too.

"Almost the only argument brought forward against American machines is their cheapness. It happens that many American firms build 20,000 and more machines a year. Moreover, they do not build a dozen different styles, but confine themselves to one light gentlemen's and one lady's pattern. Hence they can work with special machinery, which is too expensive to have it built for the manufacture of a dozen different patterns of the same article.

"True, the bicycle industry is in a bad way just now in America, on account of overproduction and the cutting of prices. But the same danger threatens us here. We do not, of course, mean to say that all cheap machines are good or all American bicycles good. We only wish to show that an American wheel must not be regarded inferior because it is cheap."

### New Style of Chainless Wheel.

ACHAINLESS bicycle, the product of a large Western manufacturer and of a decidedly novel pattern, made its appearance a few weeks ago in a New York salesroom. Its coming was heralded with less eclat than that of the bevel geared wheel that preceded it, but it may yet give its earlier rival a hard race for public favor.

The power of the new machine is transmitted by means of two mold sprocket wheels and two levers or piston rods connecting the crank axle with the rear wheel. The sprocket wheels are connected by a short band chain and one entirely inclosed. The rear sprocket turns a shaft that drives the levers, one on either side of the rear wheel, and so adjusted that it is claimed they cannot come to a dead centre. The arrangement is very simple, and as every point of contact in the driving mechanism runs on ball bearings the motion is easy and regular. One advantage claimed over bevel geared machines is the fact that the gear may be quickly adjusted to any size, from 60 to 100. The new wheel is not absolutely "chainless," but the band chain which is entirely inclosed in a metallic box between the crank hangers being entirely hidden from view gives the machine a chainless appearance.

The new bicycle was given a public trial by an expert rider who reported that like the bevel-gear wheel it responded at once to foot pressure and gave the comfortable feeling that not the least power was lost. Absolutely no back action could be felt and the wheels seemed to turn with scarcely any effort on the part of the rider. And at this the bicycle was geared to 84.

The questions naturally suggest themselves whether the levers will break, the inclosed chain stretch, or the connections work loose. If not, the new wheel will compare favorably with any of the chainless types so far placed before the public. It has one advantage claimed over the bevel gear in that it has no cogs to break and it has another advantage over some of the new wheels advertised in that its cost will be less. At any rate, it is an interesting addition to the new class of bicycles now being experimented with.

### Lamp Without a Wick.

ABICYCLE and carriage lamp has lately been patented which is designed to generate gas from kerosene oil and store it in a reservoir for use as a light. The oil is placed in the reservoir, separate from the lamp, the outflow into the generator being regulated by the valve underneath. The oil flows downward to the lamp through the pipe, which enters the top of the casing and extends over the flame to heat the oil and generate the gas. As the gas forms it expands and fills the pipe, which is used as the storage reservoir, the lower valve regulating its flow into the burner. Air is mixed with the gas before it is ignited by means of a small aperture in the pipe just below the burner, thus increasing the illuminating power of the flame. When it is desired to extinguish the flame the lower valve is closed first and then the upper, the heat remaining in the pipe being sufficient to transform whatever oil is in the pipe into gas.

This improvement is the invention of a Philadelphia man, and among the advantages claimed for it are the absence of the wick used in ordinary lamps, which has to be regulated and trimmed and renewed at intervals, the new lamp needing no attention except a turn of the valves before lighting, and burning a smaller quantity of oil. The pressure of the gas from the reservoir causes the flame to leave the burner with considerable force, thus decreasing its liability to be blown out by wind or jarred out by its vibration of the wheel.





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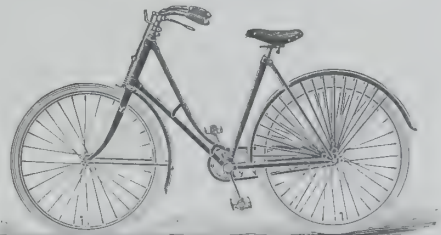
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### Important Contract with a Holland Firm.

J. M. CHABOT, of the firm of Dikema & Chabot, was recently in Pittsburgh negotiating with the Carnegie Steel Company for some very large purchases of steel and armor plate for Holland. Their firm was one of the first in that country to purchase American steel. They had consigned to them a shipment of 3,000 tons last June and July which gave such satisfaction that Mr. Chabot decided to come to this country to make permanent and more extensive arrangements.

In the course of an interview, he said: "We are the first firm from Holland to import American steel and iron. Besides our purchase of 3,000 tons last Summer, we have now contracted for between 60,000 and 70,000 tons of steel to be delivered during the coming year. The steel as we get it is in plates, sheets and bars, and is used for all ordinary purposes, especially for structural work.

"I will also endeavor to introduce armor plate for our navy. Holland has so far bought most of her armor from Creusot, France, but in the future we will very likely buy our armor in the United States. As it takes three weeks for a freight steamer to go from Philadelphia or Baltimore to Holland, besides the delay in ordering and getting the goods to the vessels, we will be compelled to fill special orders that we receive on short notice from the European mills. But as nearly all our orders are long-time orders, we will be enabled to supply the product of American mills almost exclusively. The great distance and the delay in receiving the goods is all that will hinder us in handling American steel exclusively.

"We have hitherto looked for our steel supply to European countries; but the product of American works is vastly superior to any other in the world, and here is where we will get our iron and steel in the future. The American iron market is coming to the front. It has already gained supremacy.

"I was very much impressed with the great American iron and steel plants. The machinery they contain is much better than any European machinery and the equipment throughout is superior to any in the world.

"The product of your mills is of a much finer quality than any of the European makes. The finishing is very much better, and the steel plates are much smoother. In a very short time the American products will be sold in great quantities, not only in Europe, but in all parts of the world.

"I not only come to the United States to arrange for introducing American steel and iron into the European market, but to introduce many other articles of American make such as electrical machinery, bicycles, castings, forgings and machinery of all kinds."

Mr. Chabot, continuing, expressed himself as greatly pleased with his visit. He said he had met with much greater success than he had anticipated. He also visited the Westinghouse Electric Works and would have made a similar contract with them, but for the fact that their London agent has control of the European sales.

### A Cycle Sleigh.

AN American inventor has constructed a machine which may be aptly described as a bicycle sleigh. "Snow cycles" and "ice cycles" are not unknown. The comic papers have made them familiar, and occasional reports of actual performances have shown that they are not wholly creations of the jokers. The device in question has been taken hold of by a responsible concern and the cycle that travels on frozen surfaces appears about to take a practical turn. The odd sleigh combines some of the principles of the modern bicycle with some original features of its own. The main frame is very much similar to the frame used in the ordinary bicycle, being of the drop pattern and constructed of the best seamless steel tubing. This frame is mounted in connection with a pair of wooden runners, steel shod, which are each 3 feet long, and 20 inches apart at the bottom; the entire length over all being 6 feet 10 inches, including the steering runner, the total weight of the machine being about 35 pounds. The large wheel, which corresponds to the rear wheel of the ordinary bicycle, has a steel tire fitted with spikes, thus enabling the machine to be propelled on roads of packed snow or ice, or on frozen lakes or rivers. By means of the runner, which is attached directly to the handle-bar in the same manner as the front wheel of the ordinary bicycle, the machine can be steered very easily in the same manner as the bicycle. In order to accommodate persons of different weight the rear wheel, which operates in a sliding box within a curved steel link, can be regulated by means of the adjusting screw so as to obtain a light or heavy tension of the springs. When the springs are adjusted to the weight of the person riding the machine the rear wheel will accommodate itself to the road or ice upon which the machine is being propelled, as by means of the sliding box the rear wheel is enabled to operate entirely independent of the rest of the machine; in other words, enabling it to press down upon the road at all times regardless of whether it is a level or uneven surface over which it is propelled.

A NEW method of shot firing in mines has been evolved by a working miner, the arrangement consisting in the use of a hollow brass or copper needle to be inserted in the cartridge containing the charge. The shot is rammed in the usual way, but the detonator is not placed in the charge until the stemming is completed; then, by means of a thin copper rod, tipped with hard paper, the detonator is passed up the hollow needle and placed in the position required in the charge and secured by a spring. Should a detonator prove defective and the shot fail to explode, the faulty detonator can be withdrawn and another substituted. Thus, by this device, the element of danger is almost entirely removed, no second hole where a faulty charge occurs being required; the hole is rammed before the dangerous detonator is inserted.

### The Rubber Supply.

HOW the great industries of modern times are drawing upon all parts of the world for their raw materials is well exemplified in the case of the rubber trade, whose manufacturers and dealers are already looking around for new territory upon which to depend as the increase in the consumption of crude rubber nears the limits of the production of present fields. The *Electrical World* is authority for the statement that the electrical industries alone demand a greater supply than was used in the world's entire rubber industry a generation ago, so that the necessity for new sources of supply is fully recognized, although no immediate anxiety is felt. The annual consumption of the crude gum is now estimated to be between sixty and seventy million pounds, over one-half of which is brought from South America, and a large proportion of that from Brazil. The remainder is supplied from various parts of the tropical and semi-tropical world, and from time to time new fields are opened as the older ones are worked out. It is well known that the trees are ruthlessly sacrificed in the gathering of the gum, as the natives who are employed in that work make no effort to save any tree after once tapping it, but on the contrary allow it to "bleed" to death, thereby destroying enormous forests within a very short time.

Nature is the most generous of providers, however, and doubtless the tremendous increase in the consumption of rubber will be met by increased carefulness in working the present productive fields, and in the gradual opening up of new ones, so that the bicycle of the future will not be obliged to go around tireless because of the prohibitive prices for caoutchouc. Southern Florida is being looked upon just now as a possible rubber-supplying region of uncalculated value, and if the reports of the experts who have been studying the matter are not exaggerated the American manufacturers of the future will not be obliged to import all of their crude rubber. Mexico is also attracting the attention of the rubber men. It is said, too, that with the substitution of scientific methods of culture and gathering for the wasteful ones heretofore in vogue the present production may be doubled with no extension of territory.—*Bicycle World*.

### An Automatic Oiling Device.

AMONG many new and ingenious devices is one brought out by an American maker for a system of automatic oiling. The wheel and crank axles of the cycle are made tubular and hollow and this space forms a sort of oil reservoir. To prevent the escape of oil from the hollow axles the end is plugged with a screw; under the head of the screw is a piece of packing, making the joint perfectly tight. The flow of oil is regulated by wicking drawn through small holes drilled in the axles close to the bearings. These holes are plugged so tightly that the oil will not escape when the bicycle is not in use. The moment the wheels begin to revolve, capillary attraction produces a drop of oil at the end of the wicking. The bearings with this device are kept in constant and uniform lubrication, instead of being neglected for weeks, or else flooded with oil from time to time. This device is an attractive one to wheel men, who will be entirely relieved from the necessity of watching the bearings of their machines and studying the oil requirements. The axles carry a season's supply of oil, so that when once filled they require no further attention. To renew the supply of oil, it is only necessary to lay the cycle on its side, unscrew the plug in the end of the hollow axle and pour oil into the reservoir.

### Smallest Electric Motor in the World.

AMAN named Goodin, a jeweler and watchmaker of McKinney Tex., has made a curiosity in shape of an electric motor which is probably the smallest ever constructed. It was made to be worn as a scarf pin and weighs complete one pennyweight and three grains. The front of the motor is of highly polished gold, and the commutator segments are also of gold. Viewed from the front the motor presents only a gold appearance. The field magnets are made of two thicknesses of No. 22 sheet iron scraped down and polished. These are held together with gold screws, and wound with No. 28 silk covered wire. The armature is of the four pole type, and is wound with No. 26 wire. The little brushes are of hammered copper, and are, of course, very thin. There is a small gold switch on a black rubber base, made with a pin, to be worn on the lapel of the vest. A small chloride of silver battery, carried in the vest pocket, furnishes current for the operation of the little machine. The motor runs at a very high speed, and its humming can be distinctly heard by any one standing near the wearer. This very interesting machine is now on exhibition in Mr. Goodin's store.

### Fan Motors for Photographers.

IT has always been a serious question in photographic establishments how to dry quickly the negatives after development. A plate just from the washing tank ordinarily requires from four to six hours to become thoroughly dry, and on damp days even longer. Drying by means of artificial heat has been tried with more or less success, and often with disastrous results where the film had not been previously hardened. One of Chicago's foremost engraving firms some time ago turned the ever useful fan motor upon a rack full of negatives, with the result that in from ten to fifteen minutes the largest plate was bone dry. Now, a number of these fans can be seen at work in the different departments, saving 90 per cent of the time formerly used. It is a Western Electric fan motor, for the reason it is said to produce the greatest amount of wind for the least expenditure in current.



**HENRY A. BROWN,**

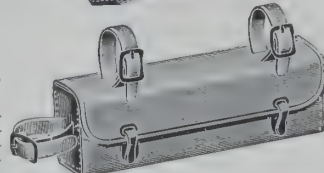
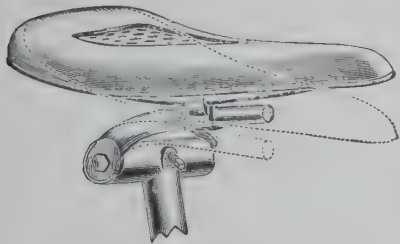
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Dotted Lines Showing Action of Saddle.

The spring, being horizontal, has a differen-  
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It takes up the action of the wheel and re-  
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It can be adjusted to any wheel, and any  
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the center of which is held stationary by an ad-  
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It does not change distance between saddle  
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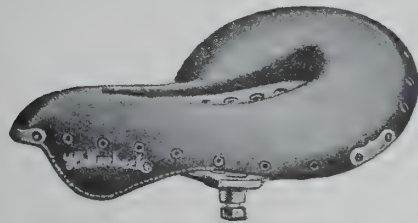
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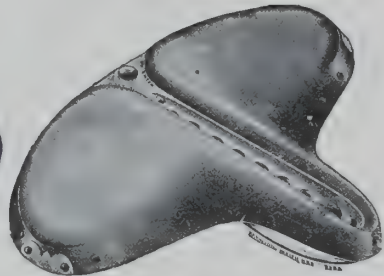
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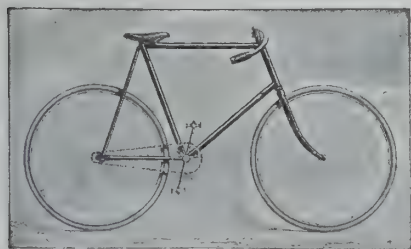
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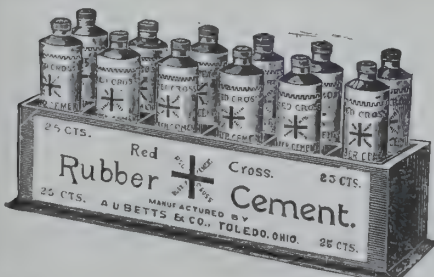
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### American Trading Methods.

CONSULAR reports indicate that American exporters to Australia take precautions that are oftentimes lacking in their efforts to secure European trade. Writing to the *London Times* at some length, an Australian merchant speaks of the telling methods of the American in establishing a market for manufactured goods in Australia. The American manufacturer or responsible manager dictates his correspondence to a shorthand typewriter, and with the invoice, the Australian says, sends also valuable information. The invoices also are typewritten, and the extensions are carried out in parallel columns in dollars and sterling at the current rate of exchange, and by means of carbon copies are furnished in triplicate. This latter is a prized facility, giving one copy for use by the importer's clerk at the custom house, another by which the stock office can work out the cost, and a third for the ledger accountant and transactions with the bank. The American excels the manufacturers of all nations in his printed matter. His catalogues are admirably illustrated, printed on good paper, strongly bound. If so requested, he will print the name of the importer on every sheet, and also the latter's selling prices instead of his own. The agricultural implement catalogues are marvelous productions. In the case of reapers and binders every separate part is illustrated and numbered, and to each a code word is attached, also the importer's price for that part. In case of a break at harvest time, a farmer living a hundred miles away can telegraph the code word for the broken part, and thus reduce delay to a minimum. The American does not seek to sell to every one. He goes to the largest house in his particular line and offers him sole control of his goods. He also goes out on the large farms and demonstrates the working of his machinery without cost to the importer.

The American has made the packing of goods sent to Australia a fine art, it seems, and has been so successful that no damage is done by the severe handling received on wharves and railways. But the best thing about the American manufacturer is, according to the Australian writer, that he seldom disputes with a customer—he knows it does not pay. An Australian farmer wrote the importer of whom he bought some American plows that the molding board of one was broken. The letter was forwarded to the American makers, who promptly replied: "This is the first time that we have been notified that one of our molding boards has been broken by fair wear and tear. Express our regret to your farmer, send him three new ones and charge all expenses to our account." That farmer was turned into a walking advertisement at very slight expense.

### Hard and Soft Coal Briquettes.

AN ingenious mechanic, Albert W. Griffith, with whom is associated James L. Orr, of Allegheny, Pa., has discovered a compound which when mixed with the culm of anthracite and bituminous coal mines and subjected to a certain process in its manufacture will make more heat, is cleaner, more healthy and can be produced infinitely cheaper than the prepared sizes or natural product. It is stated that recently samples of this artificial coal have been tested by different chemists and pronounced to fulfill all that is claimed. W. E. Gorigues, chief chemist at Duquesne chemical laboratory, after testing samples of this new coal, says that it gives off 50 degrees more heat than anthracite coal. The latter article in its best test produced 13,189 British thermal units of heat, while the artificial product registered 13,243 units. The inventors of the article have subjected it to all kinds of trials. It has been found to be absolutely proof against water. It will not disintegrate if left to remain outdoors any length of time. Then again it is very hard and takes a powerful blow to break it. The coal can be handled without soiling the hands or clothing, and its regular form makes it easy to handle. It will burn just as long as other coal, at the same time giving off more heat. The reason for the increase in thermal power lies in the fact that the compound used in mixing the coal dust is itself a high combustible and adds to the heat of the carbon in the coal. Its inventor says that no other artificial coal has been made with any success. Some has been produced by the use of pitch and coal tar, but when lighted these elements separate and run out of the fire. He claims for his coal that nothing of this kind will occur, but that it will burn with a regular flame, leaving almost no ashes. Outside the special machinery used in the preparation of the coal nothing is of a secret nature except the solution that is mixed with the coal dust. It is said to be exceedingly cheap, being really a waste product. Seven-eighths of a gallon of the solution will mix a bushel of the coal refuse. The process of manufacture will be simple. The coal from the mines needs only to be ground up and mixed with this solution, after which it will be put under a pressure of 300 pounds and made into any desired shape. It will take four hours to dry and will then be ready for market.

### Steel Cars.

THE *Railroad Gazette* contained an article recently upon "The Coming of the Steel Car" wherein it was stated that the present development of extra large cars is in steel, for the reason that the metal-built conveyances can be made lighter than wooden cars of the same capacity. By the use of steel cars it is possible to haul a more profitable load in a train of the same gross weight. Capacious steel cars can be built for approximately the same cost to the ton of carrying capacity as wooden cars. To handle a given amount of traffic fewer cars would be required and for a given load the train would be shorter. Less track and yard room would be required, fewer men to handle and care for the rolling stock would be employed, and other advantages, of short as compared with long trains on the road, are sufficiently obvious.

### New Experimental Tank.

THE United States Government is constructing at the Washington Navy Yard an experimental tank to test accurately the speed of vessels from models built upon the same lines. A writer for the *Electrical Engineer* gives the following description of the tank:

"Around the inner walls of the experimental tank, and several feet above the water, a track will be laid, running perfectly straight until the ends of the building are reached; here a curved recess is formed, and in this the models are started. On the track will be four electric motors, geared after the manner of those used on electric street cars. These will work in pairs, being connected by a transverse shaft extending from side to side of the tank and carrying at its centre a depending lever, to which the model will be attached. Thus when the motor carriages are in motion the little ships will be towed along at a speed corresponding to that of the tower, and the force exerted will be measured by a dynamometer, secured at the lower portion of the carriage.

"Although two sets of motor carriages are to be used in making speed tests in the tank, one set is to be employed as an auxiliary power for higher speeds. The maximum motor force will be about 100 horse-power, derived from an electric plant to be built specially for the experimental work. The models are to be made 20 feet long, a size much larger than any heretofore employed in experimental work of this kind. They will be of many different kinds, and their testing will no doubt give much useful knowledge to those concerned in naval architecture. Of course there is no such thing as establishing by model tests absolute certainty in regard to the speed and behavior of a ship at sea; but by getting the difference in force exerted upon a model and that expended in driving a ship built after such model the speed of the latter must at least nearly correspond in ratio to its full-size representative. One thing is certain, that if the 'model' idea is correct it will be an easy matter to choose by experiment the best of their kind much more so than to begin and end the experiment in the ship, which does not always prove a greyhound of the deep.

"The experimental tank when finished will represent a considerable amount of Government money. One hundred thousand dollars have already been appropriated for the building, tank, etc. But by the time everything is ready for operation the sum named will be generously increased."

### Precious Metals from the Sea.

THE Electrolytic Marine Salts Company has bought two tide mills on Passamaquoddy Bay in Maine at a point where there is a 20-foot tide. One mill is in perfect condition. A gang of 50 men is at work putting the other mill into shape, and both mills will be surrounded with a fence 10 feet high, so as to keep out intruders. The gates of the dam are opened when the tide comes in and closed at high tide. The water then passes through a series of identical pieces of apparatus, each of which is a complete machine in itself and uses water independently of the rest. In these machines is placed the secret combination of salts which precipitates the gold and silver. The machines are self operating, so that three men can handle 150 of them. Each tide brings in new material.

Twenty machines have been erected and the company will put in 150 at this point. Another plant—they do not say where—has been secured to be in operation January 1st. The output, as soon as all the machines are started next month, it is said, will be \$100 a day in gold besides the silver. Each ton of sea water yields from a half to a whole grain of gold, and from 1 to 2 grains of silver. The cost of separation is very small. The company by Spring expects to have a plant producing \$1,000 a day. Its president says there is gold enough in Long Island Sound to pay off the national debt and leave a larger surplus in the United States Treasury than ever has been known. The process is so simple that were it revealed any man could use it. Armed guards will protect the secret, at the works, which is known now by but two members of the company. They have spent the sum of \$50,000 in experiments in the Sound, Narragansett Bay, the Irish and German Seas and the South Pacific Ocean. Everywhere they have found the proportion of gold and silver about the same. The amount of gold in all the oceans is estimated at 70,000,000,000 tons, \$48,000,000,000,000. As each tide brings in a new lot of water, no one can compute how much they can make. The water has the same qualities of saltiness after the metals have been extracted. The company has given certain persons whose interest it wants to enlist an opportunity to make tests by themselves, and the results have been satisfactory.

### Marble from Gypsum.

THERE is a new process recently invented in Canada for transforming gypsum into marble, and so cleverly is the deception carried out that no practical difference can be distinguished between the natural and the artificial article. The stucco and gypsum producers of central Kansas are putting the process in operation and will introduce the new product to the United States. The gypsum is treated with a chemical solution which crystallizes it. When in this state it can be fashioned by a turning lathe or a chisel. A feature of the new product is its susceptibility to a high polish, when in all respects it is as handsome and apparently as durable as marble.

At present Canadian manufacturers are getting their supply of gypsum from the United States, which must necessarily be rather stale before it can be subjected to treatment. It is thought that better results can be obtained in Kansas with newly raised gypsum than abroad after long shipments. The gypsum belt in that State covers four counties and is practically inexhaustible.



# IMPERIAL Bicycle Lanterns

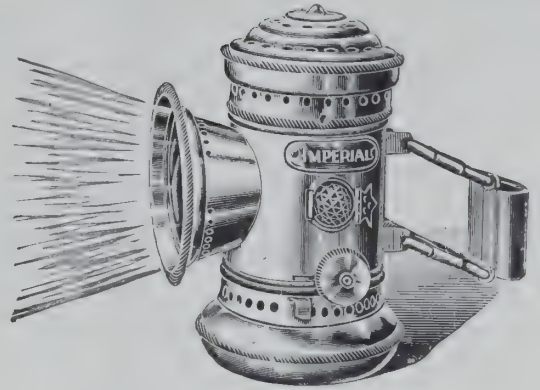
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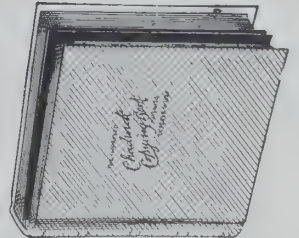
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Is most desirable for sheds and porches, also for barns, stables, outbuildings, etc., where "no smoking" is desired. This is an extra fine Lamp, made in three sizes, has no chimney, and no complication to make trouble of any sort. It has an improved burner and outside wick regulator; gives a very brilliant light that the strongest wind cannot quench—and, in general, it gives universal satisfaction. The list prices of the three sizes of this lamp are \$5.50, \$6.50 and \$8.50, and the export discount 40, 10 & 5 per cent.



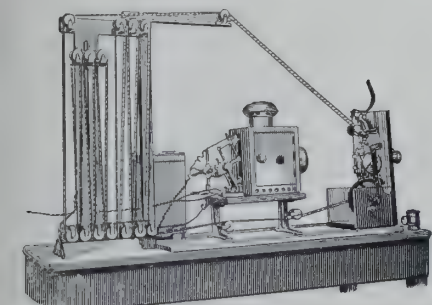
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Edison Projecting Kinetscope, complete for electric light;  
12 Standard Edison 50-ft. Films;  
1 Standard Edison 50-ft. Film, colored;  
1 Film Mender and Cement;  
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Same as No. 1, but with complete Calcium Light Outfit in addition so as to use the machine anywhere independent of electricity.

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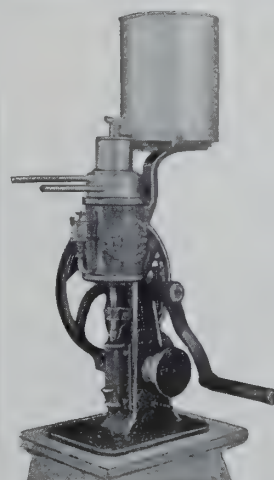
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For FAMILY or FACTORY USE.

Hand Power.

Perfect Separation.

Made in eight sizes. Discount 20 per cent. off; f. o. b. New York. Price of Pulley for use by belt, \$2.50 additional.

No.	Capacity	Price.
No. 0 Separator	100 lbs. of milk per hour (for family use)	\$30.00
No. 1 Separator	150 lbs. of milk per hour	50 00
No. 2	225 "	75.00
No. 3	300 "	100.00
No. 4	425 "	125.00
No. 5	550 "	150.00
No. 6	1,200 "	280.00
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## New Catalogues.

—C. W. TANNER & Co., Richmond, Va., paint and varnish makers: A concise pamphlet upon the "Preservation of Iron and Steel Structures," which is the title of the work. It describes the sulphur, acid and brine proof paints manufactured by this firm.

—CROSBY STEAM GAGE & VALVE COMPANY, Boston, standard steam appliances: A handsomely bound and illustrated catalogue and price list portraying a great variety of steam gauges, valves, siphons, test pumps, thermometers, gauge cocks, water columns, safety valves, lubricators, oil cups and feeders, regulators and all appliances and appointments for a well regulated engine room. The book contains cuts of the company's extensive plant and various exhibition awards. The list of steam gauges is particularly complete, and shows many very handsome designs. A number of novelties useful and ingenious is set forth and there is also contained in the work much useful information for both salesman and engineer.

—THE WATEROUS ENGINE WORKS COMPANY, Limited, Brantford, Canada: A catalogue and price list with telegraphic code containing a long and varied list of engines, boilers, machines and special appliances manufactured by the company. Each description is concise, attractively illustrated, and accompanied by its code word. Some of the principal classes of machinery enumerated are engines and boilers especially adapted for use on farms. Sawmill machinery is also a feature of the catalogue, and boilers, engines, feedworks, carriages, log jacks and chains, gang edgers, circular saws, sawdust conveyors and innumerable other needed appliances and tools for the sawmill are set forth. Veneer and basket machinery has also a place, and the list closes with rock crushers and special steam governors.

—THE CHALLENGE MACHINERY COMPANY, 2529 Leo street, Chicago, Ill., printers' machinery: This company has just issued three interesting booklets descriptive of a very complete list of printing machinery. The pamphlets bear somewhat unique titles as follows: "Pulling the Devil's Tail," "A Cut in Paper" and "Printing Money." The first which deals with the company's Ideal hand press, contains a description of the machine and a number of substantial testimonials. The second illustrates and gives an exhaustive description of an improved paper cutter for printers' use. The third is devoted to a portrayal of the company's Challenge-Gordon job press with illustrations of many of its special improvements. These little books also contain much information that is both interesting and useful.

—FOLDING SAWING MACHINE COMPANY, 64-66 South Clinton street, Chicago, Ill.: An illustrated catalogue and price list of the company's patented folding sawing machine and its parts, saw blades, and tools for keeping saws in order. The catalogue gives several views of the machine. There is shown the saw as folded ready for shipment or storage; the saw felling a tree close to the ground and again at 27 inches from the roots; the saw working on a hillside, and in operation under varying positions. Full instructions as to use are given, and a host of testimonials certify to the excellence of the machine.

—BUCKEYE INCUBATOR COMPANY, Springfield, Ohio: An illustrated catalogue of the company's incubators and brooders, containing also an interesting treatise upon artificial poultry raising. The work opens with "a plain talk on the desirability of incubators and brooders," and "practical poultry points." It also treats "on feeding" and "poultry hygiene" and "poultry points." Next it directs attention to the qualities of a good incubator and how to select one. The merits of the company's appliances are graphically set forth and plainly illustrated. Three styles of hatchers are described—the Buckeye, the Invisible and the Bantam. Five styles of brooders are shown and their various peculiar uses set forth.

—THE CASE REFRIGERATING MACHINE COMPANY, Buffalo, N. Y.: A neatly illustrated pamphlet devoted particularly to a description of the company's small ice and refrigerating machinery. The construction of the machine is gone into detail and the various parts such as crank, shaft, compressor or gas cylinder, water jacket, etc., are described. An illustration is given of a small ice plant occupying a floor space of 6 feet 6 inches by 5 feet 8 inches and a capacity of 100 pounds per day of 10 hours. The various attachments and appliances are concisely set forth, and a tabulated descriptive list given of belt-driven refrigerating machines. The booklet also shows some fine cuts of large ice and refrigerating machines, ammonia valves, fittings, etc.

## Photograph of a Meteor.

AN astonishing discovery has quite lately been made. Harvard Observatory has obtained a photograph of the spectrum of a meteor. By reason of this people can now tell what goes to make up to some extent the shooting star, which passes so quickly that it can only be photographed by having a camera gaping open waiting for it to cross the sky.

The photograph was taken on June 18th, in Arequipa, Peru, the South American station of the observatory. It was a sheer piece of good luck. Thousands of plates have been exposed to the sky, with the prism over the mouth of the camera, ready to take a spectrum of anything that traversed the heavens.

The lucky plate that caught the meteor has running across it obliquely a light band of six lines, the trail of the shooting star. The spectrum of the meteor taken at Arequipa shows four hydrogen lines at different colors in the spectrum and two other lines that are unknown quantities at present. Many variable stars—those whose brilliancy increases or falls off from time to time—have had their spectra photographed.

## Miscellaneous Notes.

—At the Nashville Exposition the G. & H. Barnett Company, manufacturers of the Black Diamond files, earned the silver medal, being the highest prize offered for this class of goods.

—The British steamer Millfield will sail from Baltimore with about 300 tons of water pipe manufactured at Millville, N. J. The pipe is consigned to the Oxbridge Union District Council, of Avonmouth, England.

—A press dispatch from Denver, Col., dated November 15, states that the Rt Rev Dean H. Martyn, of that city, has invented a substitute for rubber which can be manufactured for five or six cents a pound. The new material is called perchoid.

—It is reported that the American Tinplate Company, of Elwood, Ind., has begun to ship tinplates to Europe on regular order. The first lot consisted of a carload of 500 boxes, destined for Italy. A similar order is said to have been filled since for England.

—The Baltimore and Ohio Southwestern Railway has been trying electric motors on turntables. It cost an average of less than one-half a cent for each time the table was turned. When the same table was operated by hand it cost 12 cents for each engine. The yearly saving is said to be about \$709.

—The Ordnance Bureau at Washington, D. C., has made a test at Indian Head, firing a 10 inch armor piercing capped shell at a 14½-inch plate. The latter was nickel steel, harveyized. The shell went through the plate and exploded on the other side. The test was considered most satisfactory.

—From a mechanical standpoint the bicycle of to-day presents a most interesting study, the engineering problems which have been mastered in its construction now receiving the attention and approval of the leading mechanical engineers, most of whom used to neglect or ridicule all connection with the bicycle.

—We are pleased to note that many American manufacturers have received high honors at the recent International Exposition at Brussels. In the line of typewriting machines, for instance, the Remington Typewriter Company was awarded a special diploma of honor and the Densmore Typewriting Company a gold medal.

—Mr. James R. Morse, the American engineer, is now building the Seoul-Chemulpo Railway in Korea. An American syndicate, in which Andrew Carnegie is interested, is said to have applied to the Korean Government for three important concessions which the syndicate proposes to develop in connection with the said line.

—Electricity is used to heat a new flat iron, the iron being made hollow and having a metallic core, layers of resistance wire arranged on the core and insulated therefrom and a metallic strip between the layers of wire in contact with the base plate to be heated, the current being obtained from an ordinary incandescent light socket.

—It is stated that Mr. Val Brown, of Whitely County, Ind., has given a Fort Wayne, Ind., firm an order to build a gasoline engine for hauling logs. It is to be of 15 horse-power and geared to run eight miles an hour without a load and four miles when drawing a load. Lumbermen in the vicinity are watching the result with interest.

—Work on the eight engines being constructed at the Rogers locomotive works for a Chinese railroad is nearing completion, and the strange-looking engines will soon be ready for shipment. They are built on the English plan, as the order was first sent to an English firm, but a strike occurring there, the order was transferred to the local firm.

—The world's record for the greatest number of heats in a steel mill has, it is claimed, been broken at the new Bessemer plant of the Cambria Iron Company, Johnstown, Pa. Ninety-four heats were made, breaking the world's record of ninety-two, made by the Carnegie Company in its Homestead mills. Over 1,044 tons of steel were put out in 14 hours.

—The American Strawboard Manufacturers' Association, which embraces thirty-four mills in this line, has decided to undertake the development of a foreign market for the output. C. A. Bell, of Cincinnati, export agent of the association, will sail for London in a few days, to spend the Winter and interest the English manufacturers in American strawboard.

—A new journal-bearing metal has lately been introduced here for which is claimed that it will not heat under any conditions, that it will not granulate or crystallize and that it will prevent any possibility of a cut or worn journal. The Michigan Mining School made a test of the metal with the result that a 3 inch shaft running through a bearing made of it at a speed of 1,400 revolutions per minute showed no signs of wear.

—A writer in the *American Manufacturer* gives some interesting information regarding the great variety of plants grown in that country which can be utilized for their fibre. Mexicans are buying largely of American machinery for the purpose of working up these fibre plants. The writer thinks that from now on importations of American machinery into Mexico will be very large. He says that one woolen factory recently imported machinery to the value of \$180,000.

—A London paper devoted to the hardware trade states that American hardware is likely to supplant English and Continental manufacturers in Australia, both in regard to prices and in the adaptability to customers' requirements. It admits that in barbed wire, axes and files, American makers have had the advantage for some time, while their wire nails, edged tools, wood handles, coach furniture, steel boring bits and tubing are rapidly supplanting those of their competitors.





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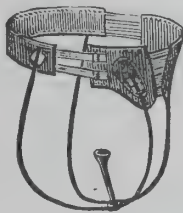
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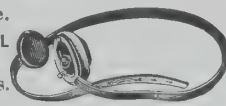
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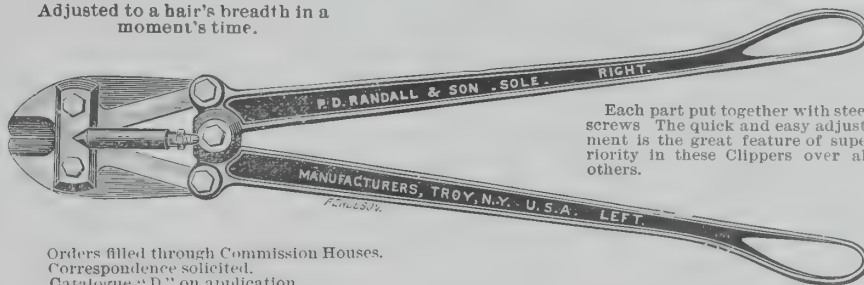
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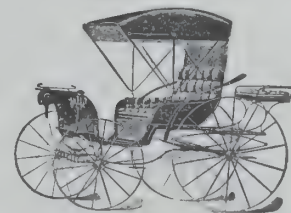
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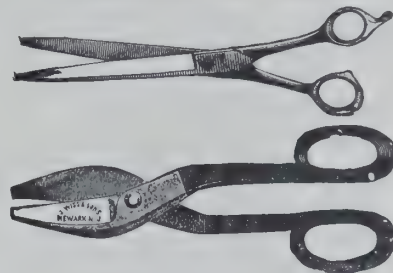




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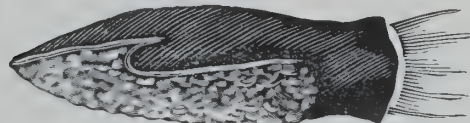
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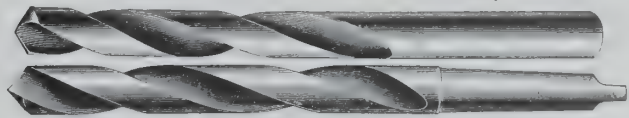
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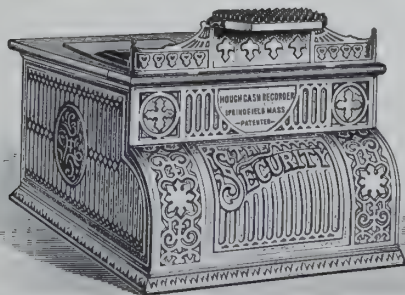
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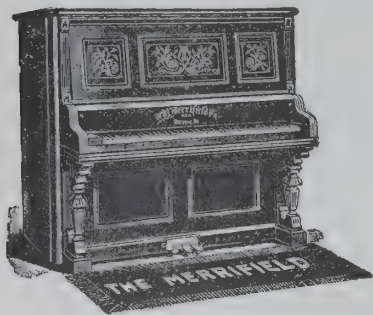
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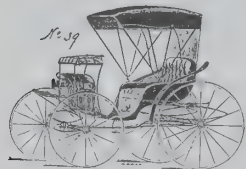
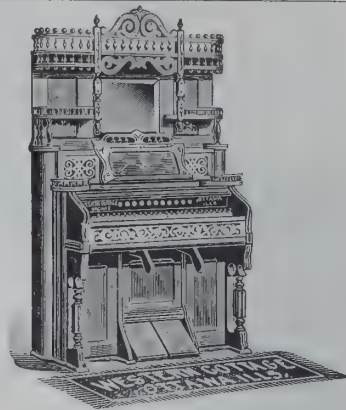
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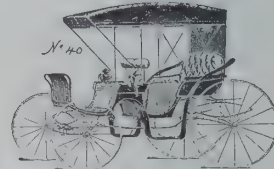
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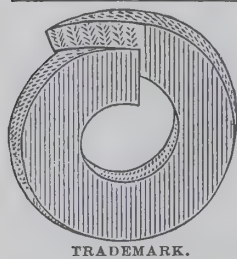
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Zementine is a white powder; 2 lbs. dissolved in one gallon water will cover 100 sq. ft.; price, 6c. per lb. in bbls. of about 350 lbs.



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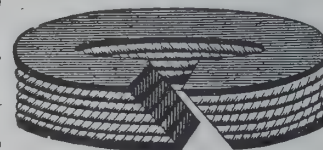
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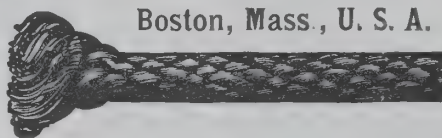
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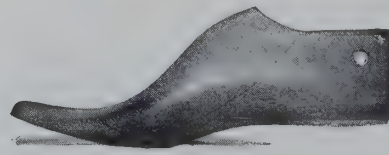
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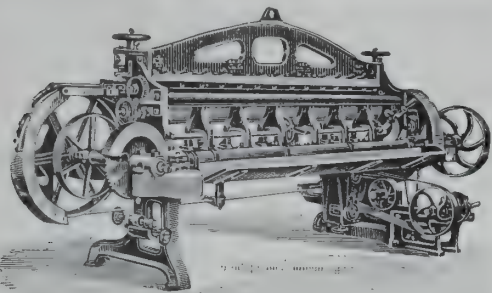
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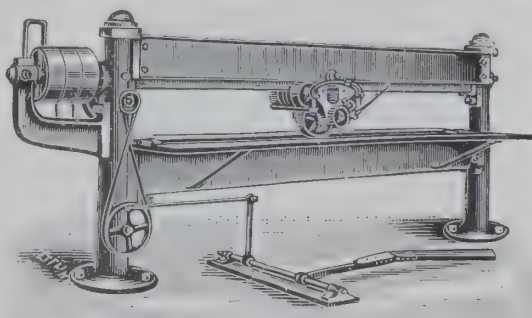
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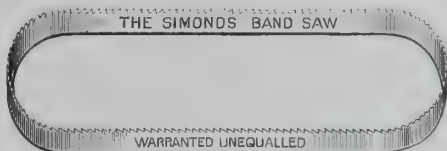
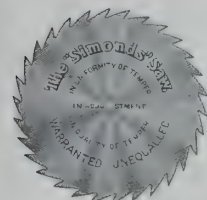
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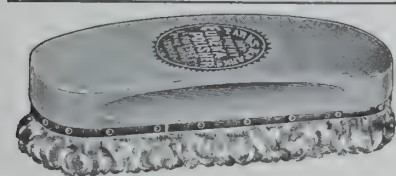
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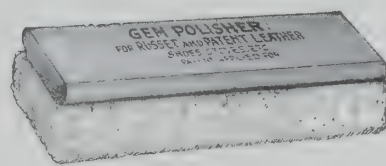


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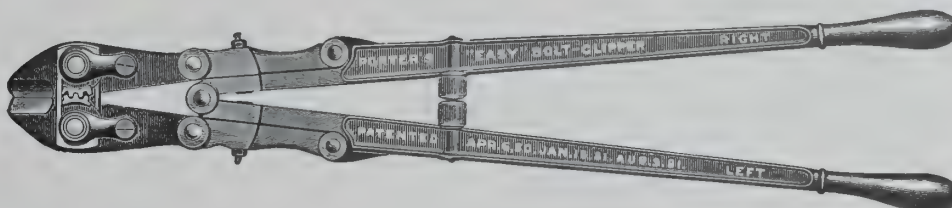


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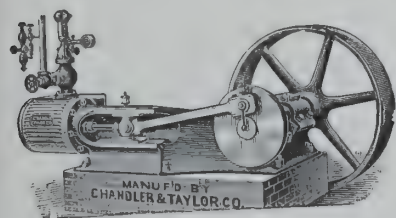
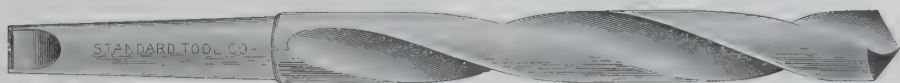
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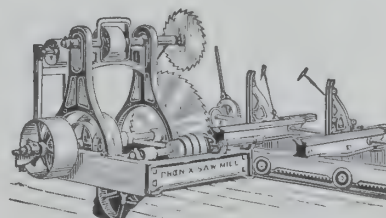
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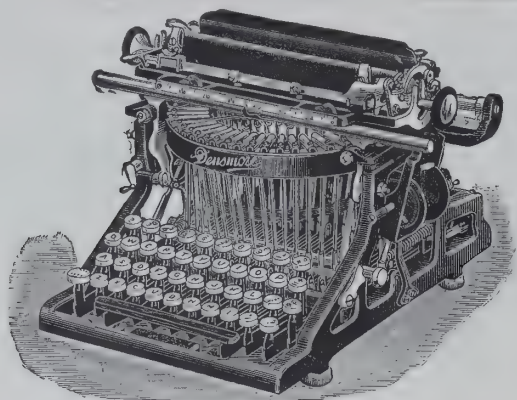
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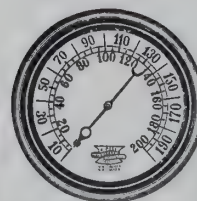
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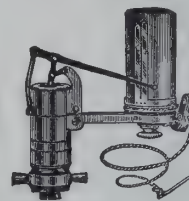
Safety Valve.



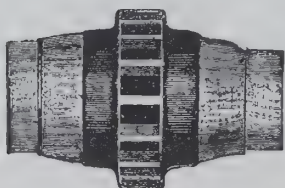
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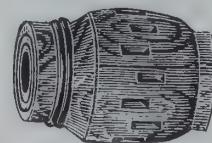
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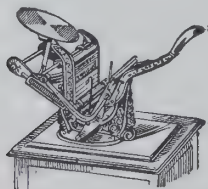


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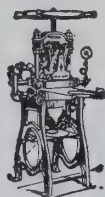


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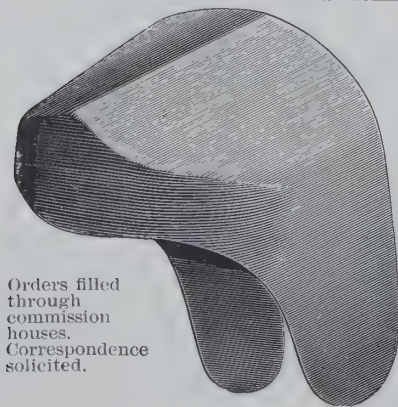
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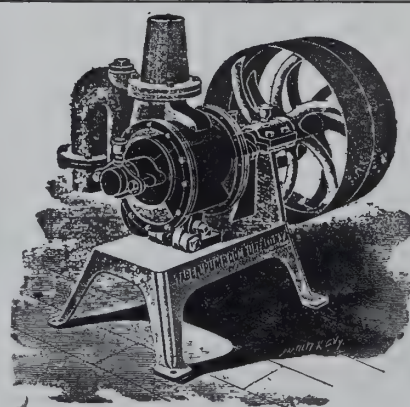
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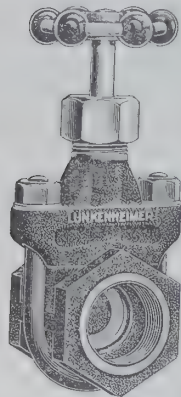
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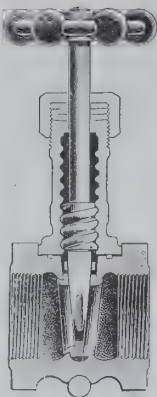


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Made in iron, brass mounted, or all iron. All bearing parts made of gun metal. Has a single disc, is double seated, and is intended for all ordinary pressures. Body and hub held together by a steel clip; always easily taken apart. Imbedded copper wire indestructible joint between hub and body.

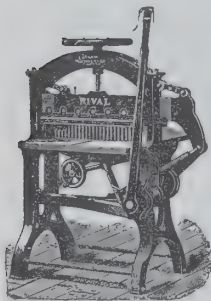
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Every Valve Tested and Warranted.

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The cutter is also furnished with a finger gauge for cutting stock within half an inch of the knife, without extra charge. The capacity of each cutter is one-fourth of an inch larger than stated above. Each cutter is provided with a regular back gauge of sufficient length to enable small work to be squared with both back and side gauges. Write for circular and prices of the Rival Power Paper Cutter. Order through any reliable commission house; always send duplicate of order to us

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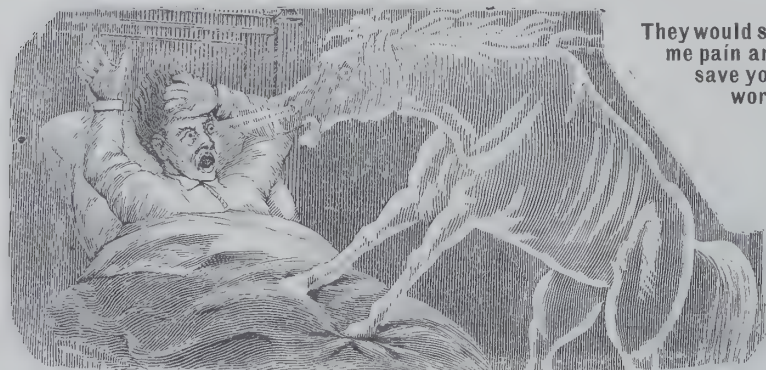
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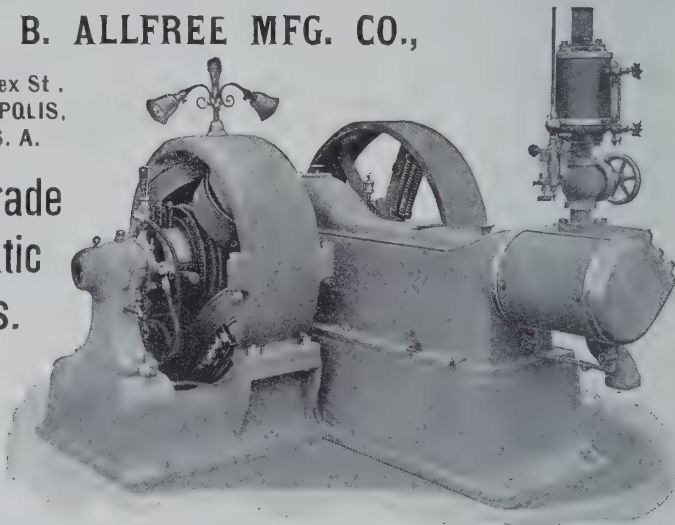
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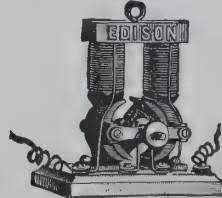
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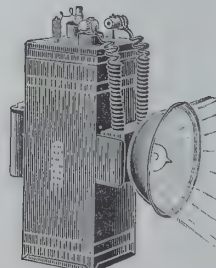
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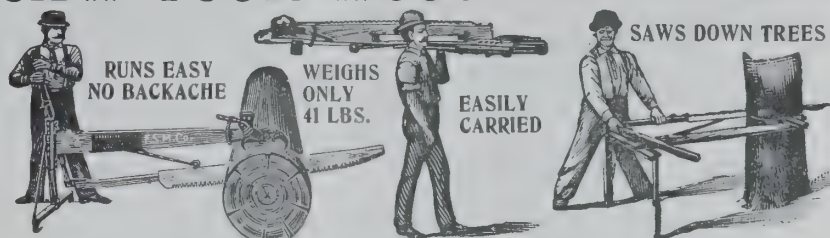
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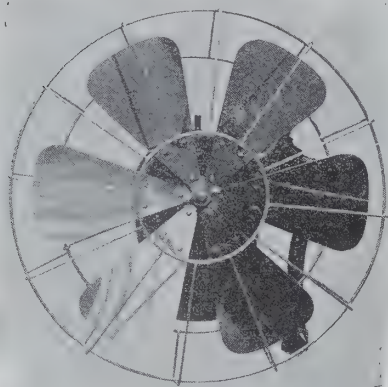
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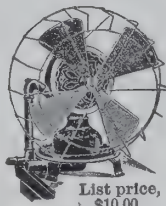
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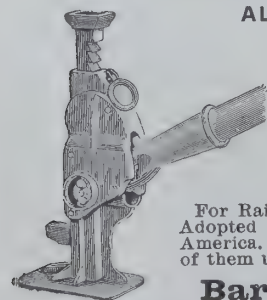
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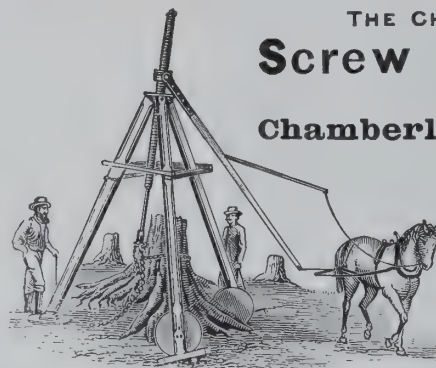
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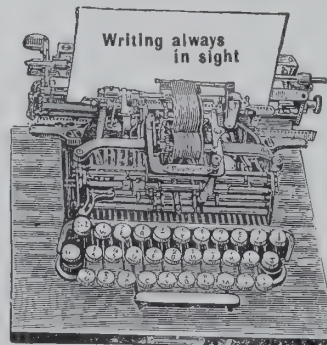
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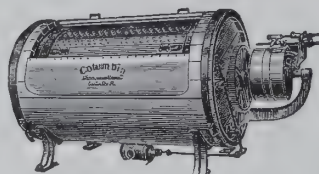


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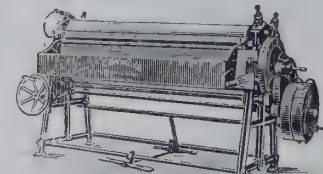
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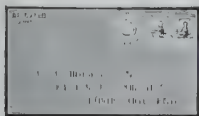
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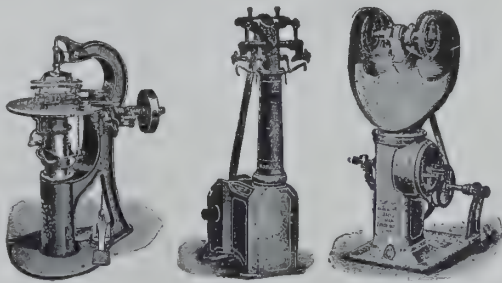
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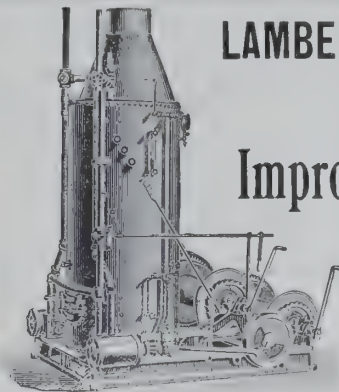
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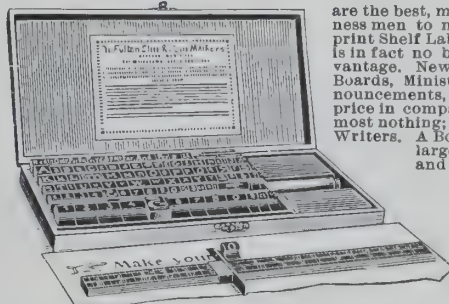
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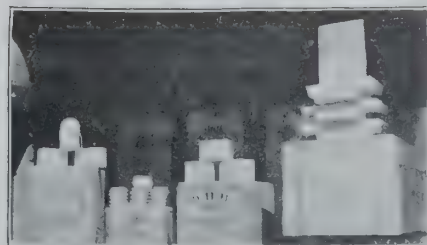
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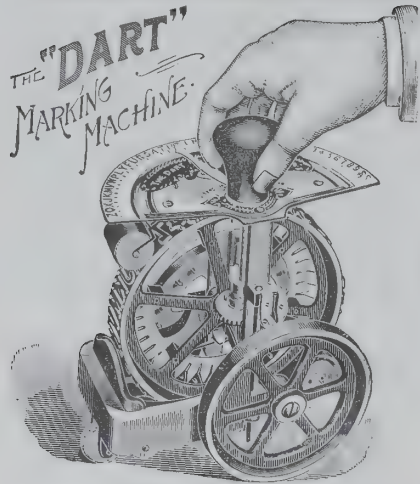
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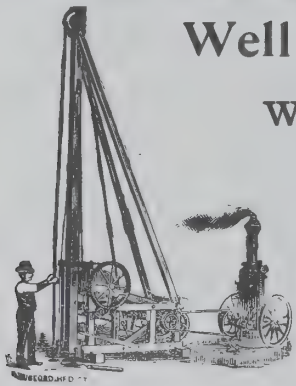






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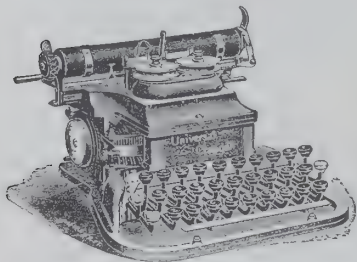
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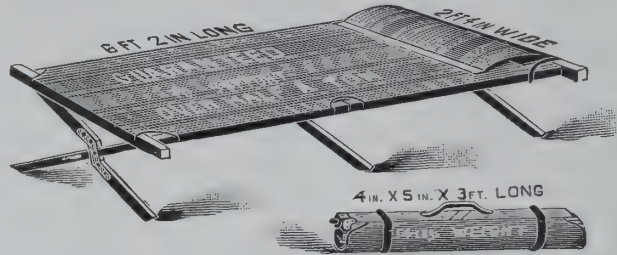
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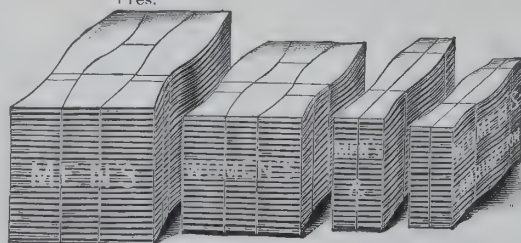
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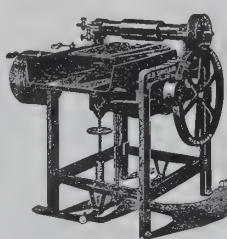
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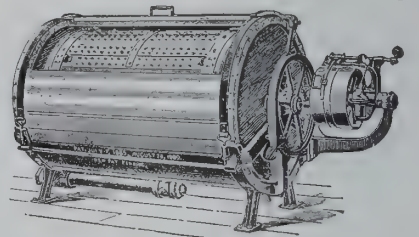
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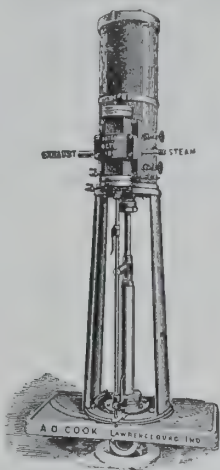


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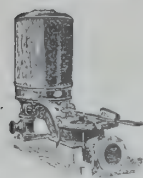
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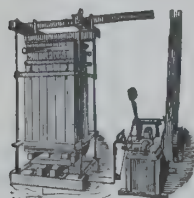
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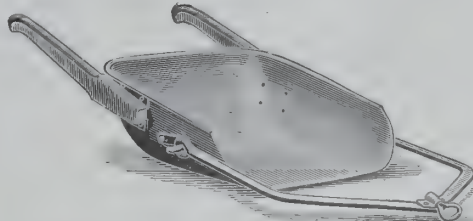
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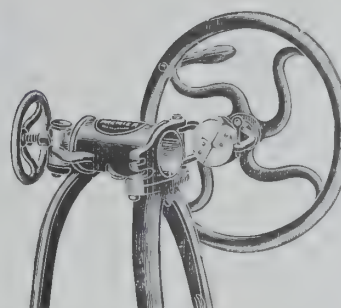
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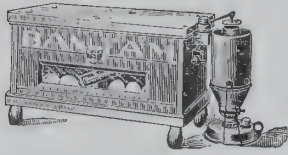
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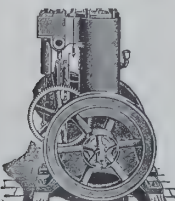
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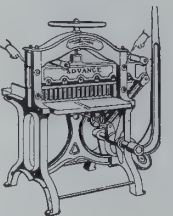
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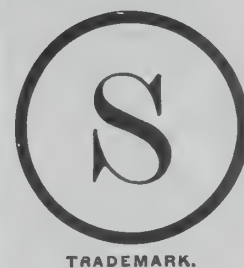
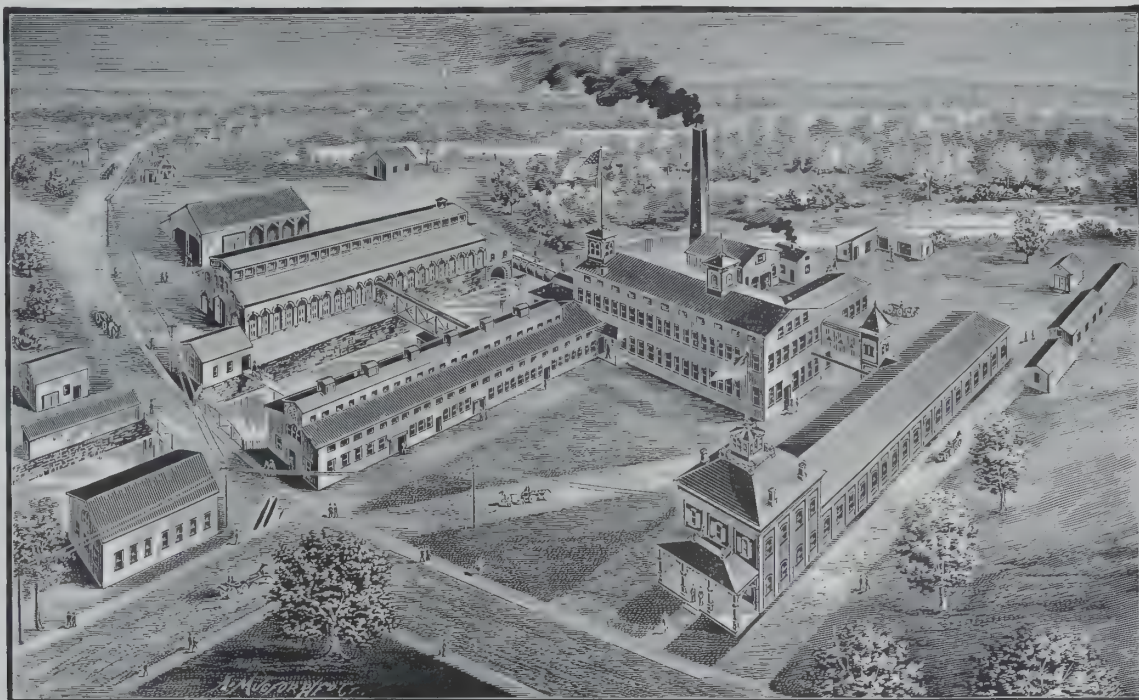


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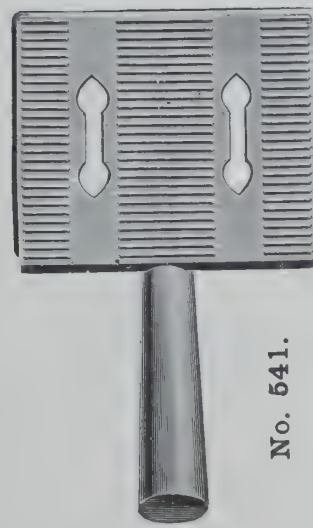
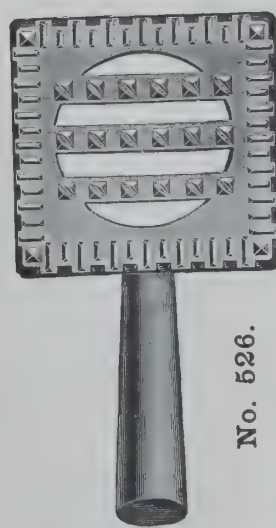
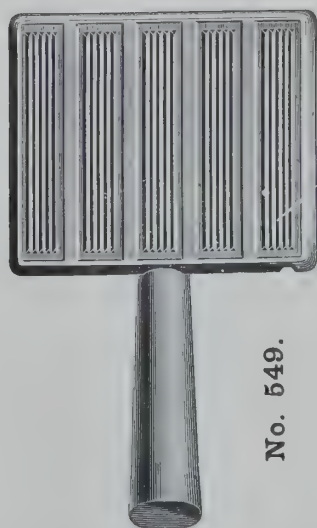
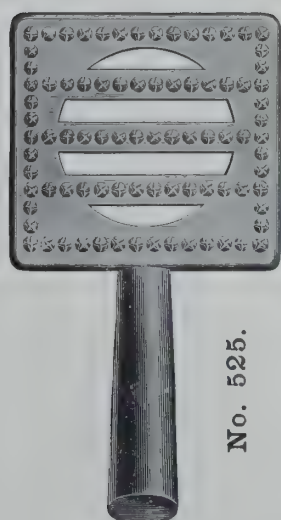
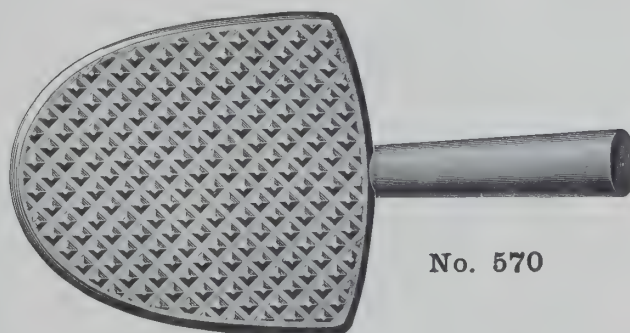
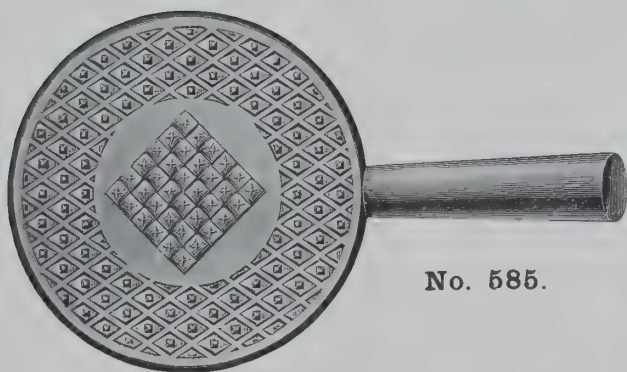
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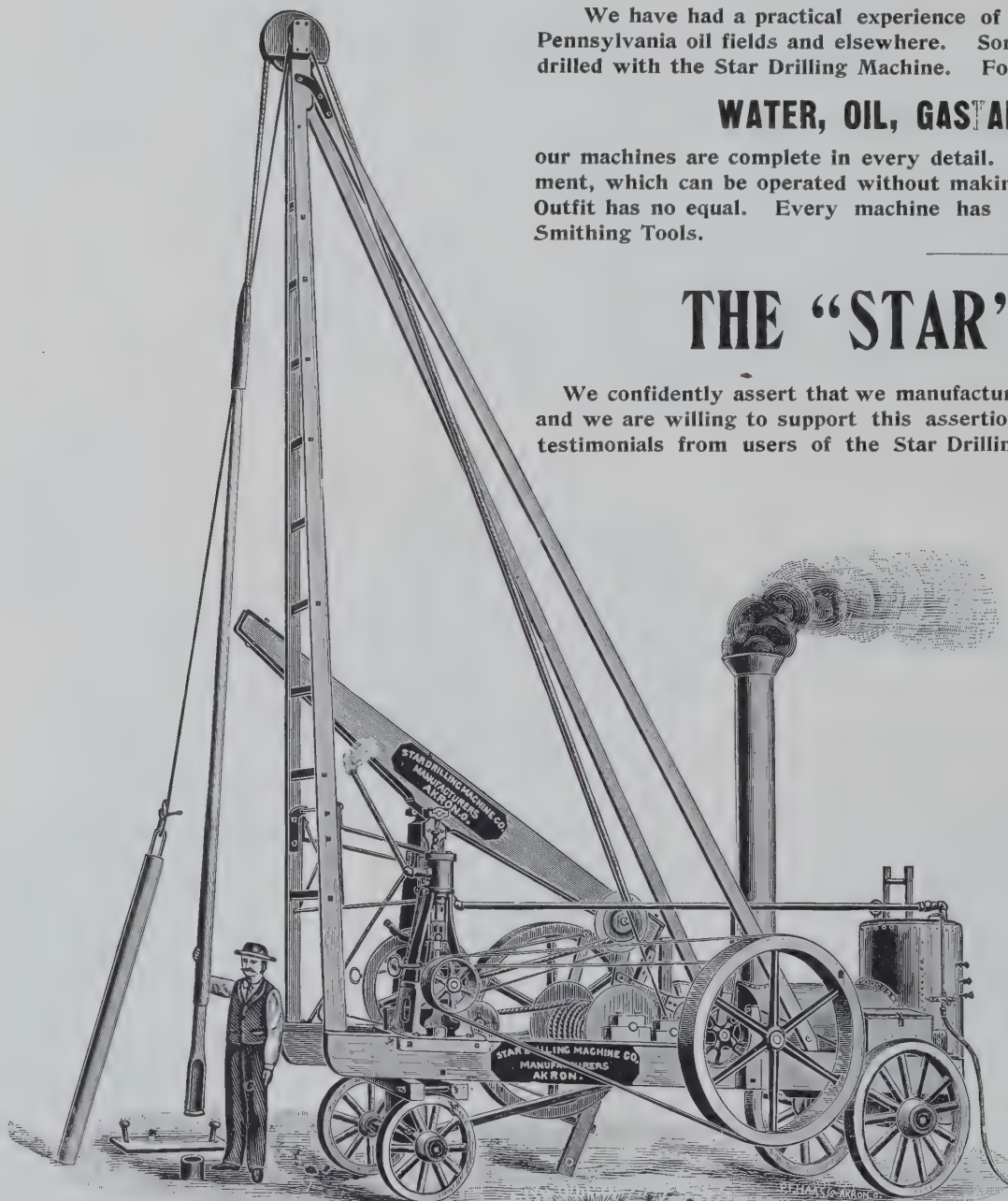
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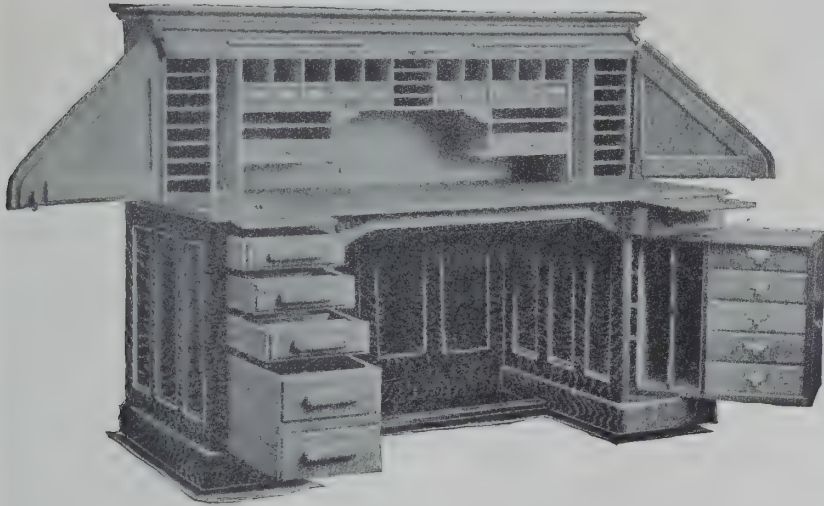


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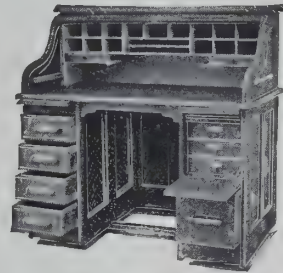
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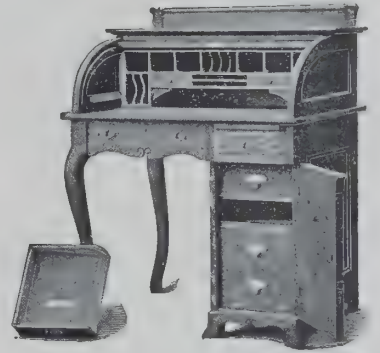
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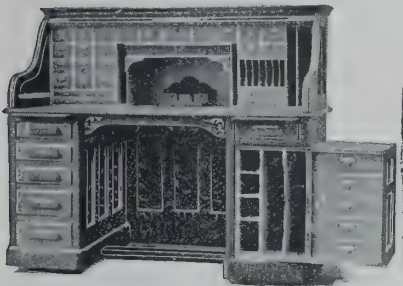
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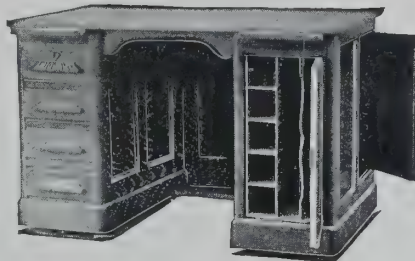
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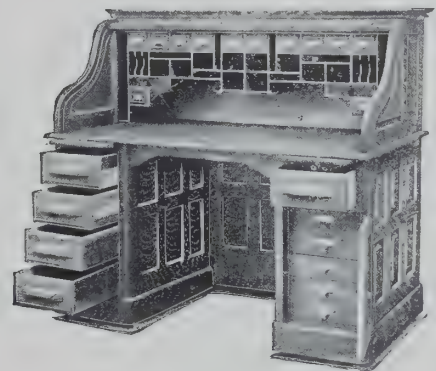
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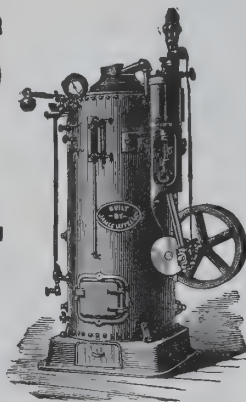
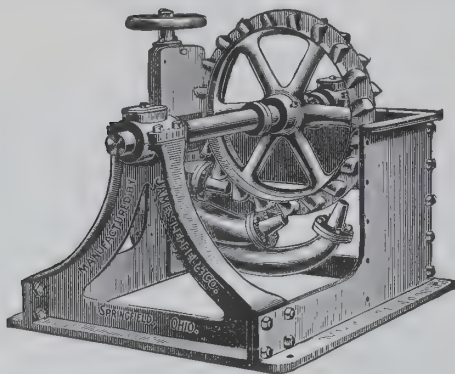
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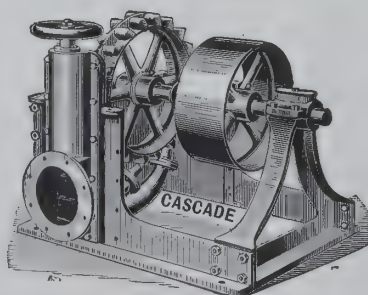
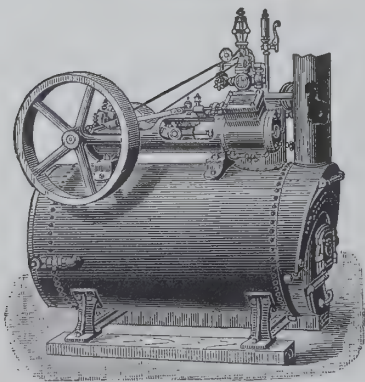
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229 & 230 WEST ST.  
NEW YORK.

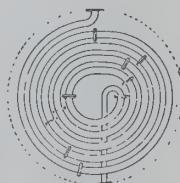
ESTABLISHED 1867.

INCORPORATED 1892.

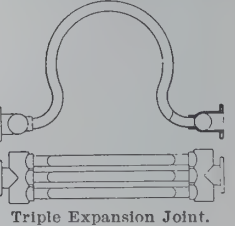
EVAPORATORS AND CONDENSERS.  
MILL AND RAIL ROAD SUPPLIES.  
STEAMSHIP REPAIRS.  
BOILER MAKERS AND MACHINISTS.  
SHEET IRON WORKERS.  
STEAM, WATER AND GAS FITTERS.  
BRASS FOUNDERS AND PLUMBERS.  
COPPERSMITHS AND PLUMBERS.  
SHIP JOINERS AND CARPENTERS.  
ENGINEERING SPECIALTIES AND SUPPLIES.  
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PNEUMATIC TUBES AND FILTERS.

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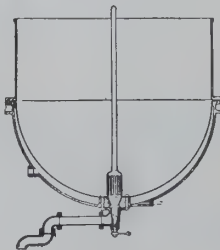
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for Heavy Pressure.



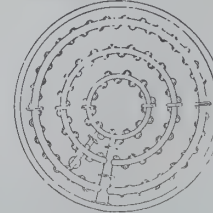
Sugar Pan Coils.



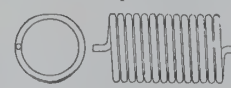
Triple Expansion Joint.



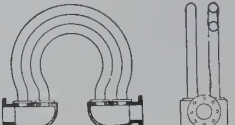
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Reilly's Improved Sugar Evaporator.



Heater Coils.



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Single Expansion Joint.



# ILLINOIS CUTLERY CUTS! THE HAZELTON OR PORCUPINE

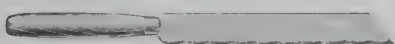
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Wire handles; nickel plated; each set in carton. One dozen sets in labeled paper box.



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**BEST in the World.**

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**Combined Grater and Saw Cutter.**

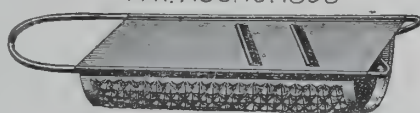
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One dozen in a box.

PAT. AUG. 15, 1893



One dozen in box.

Do You  
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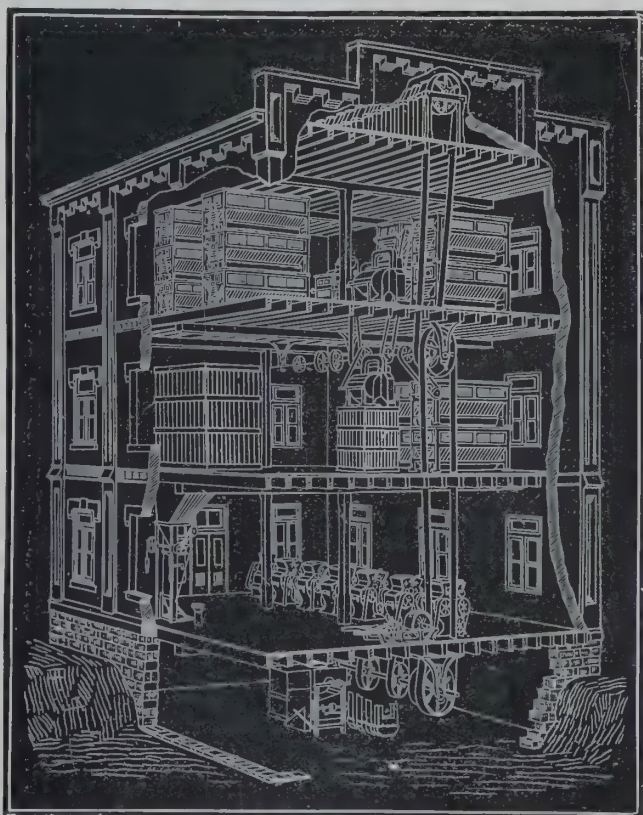
And  
This  
Edge?

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## Flour and Corn Milling MACHINERY.

We make Latest Improved Machinery and build Mills on Up-to-date System.



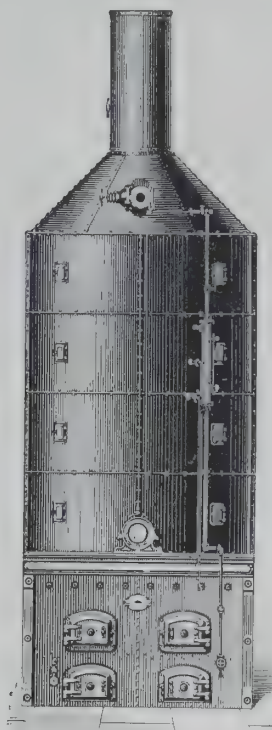
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WITH AN  
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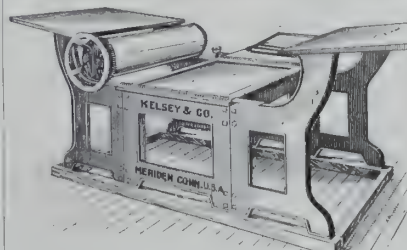
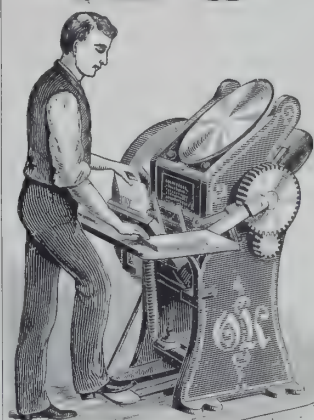
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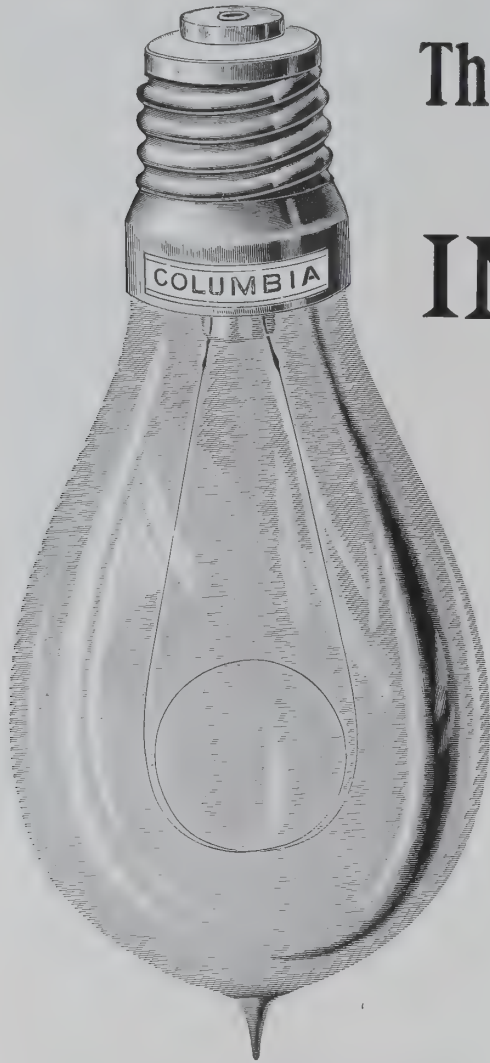
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## ST. LOUIS, MO., U. S. A.

Manufacturers of Strictly High-Grade

# INCANDESCENT LAMPS



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Our product surpasses all others in maintenance of candle power and uniformity in consumption of energy. Owing to the high maintenance of candle power we specially request users to order lamps up to the maximum voltage at which they are to be operated. As the lamps do not grow yellow with age, they should not be operated at an excessive voltage.

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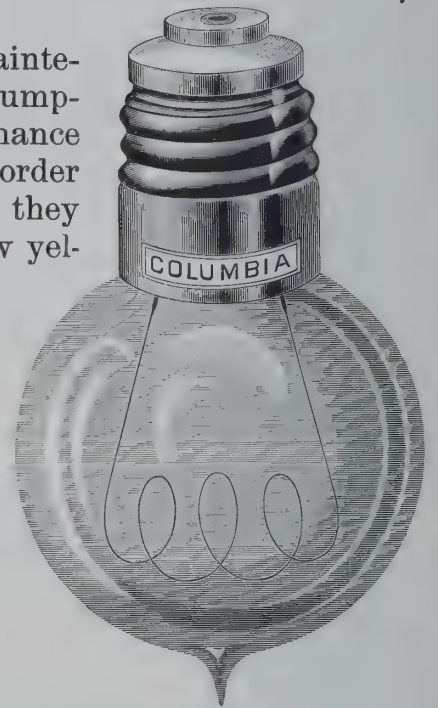
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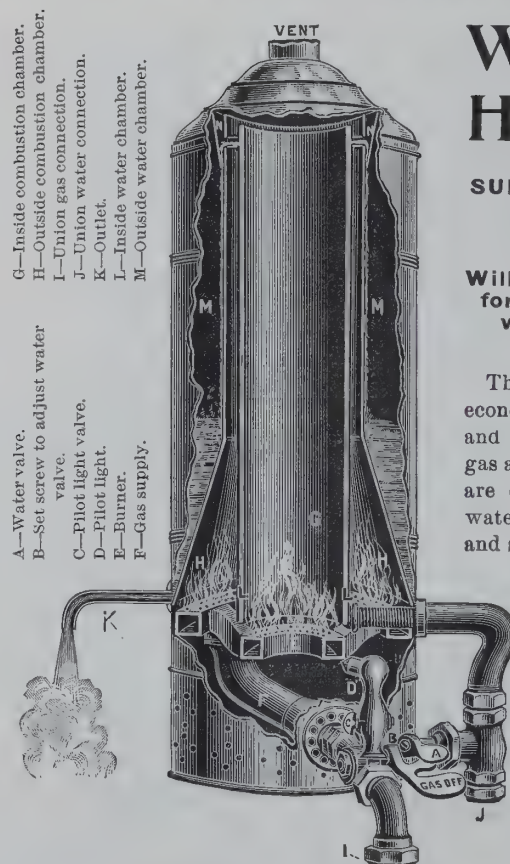
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(Founded by ROOT &amp; TINKER, 1877),

AND

THE AMERICAN MAIL AND EXPORT JOURNAL

(Founded by HOWARD LOCKWOOD &amp; Co., 1877).

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We shall be pleased to send to foreign buyers not having buying agents in New York the names and addresses of reputable concerns best qualified to serve them, provided that they state the nature of their business and the class of goods they are most likely to require.

1897.

THE year just closed will ever be memorable as marking the first general recognition, both at home and abroad, of the great and permanent importance of American export trade. Heretofore American manufacturers have found that it required their utmost energies to keep up with the amazingly rapid expansion of the domestic demand, and, except in a comparatively few instances, have been inclined to disregard the possibility of winning foreign markets. The zeal with which railways, both steam and electric, have been projected in every direction, the almost magic swiftness with which cities, and even populous States, have sprung up where a few years ago the buffalo and the Indian roamed undisturbed, have kept every form of industrial energy employed to its utmost capacity. A limit to all this was, however, inevitable, and owing to the enormous development of labor-saving machinery, has been reached far sooner than would otherwise have been the case. Consequently, the vast establishments created primarily to supply this home market, that has for so many years been growing at a rate faster than they could keep up with, at last find that they can not only supply the domestic demand, but produce a surplus, increasing in magnitude every year for the wider markets of the world at large.

Coincident with this discovery, and due in part, it is probable, to the resulting energy of American firms in pushing their goods abroad, there has been a notable recognition throughout the world of the fact that America is no longer to be regarded as an exporter of agricultural products merely, but as a producer of the first importance of a thousand forms of manufactures in universal demand, and, more than this, that in many lines the American products are superior to any heretofore placed upon the world's markets. Europe, Asia, Africa and Australia, as well as the rest of the two Americas, have been ordering in consequence American loco-

tives, electric motors and supplies, steel rails, bridges, bicycles, tools, farming implements and machinery, labor-saving machinery of a hundred kinds, and thousands of manufactured articles as never before.

All this is not a sudden growth, however, but the result of forces steadily at work for many years. The significance of 1897 is not that America's exports began in that year, but that then, as never before, their importance became recognized—recognized by American manufacturers as necessary to the fullest success of their business, recognized by foreign buyers as necessary to the best development of their resources, the best equipment of their industrial plants, the cheapest and most attractive stocking of their warehouses.

In view of this great and exceptional importance of 1897 in the annals of American export trade, this number of THE AMERICAN EXPORTER contains several articles on the exports for that year in some of the more important lines of industrial activity in this country. Space does not permit us to present as many industries in this manner as we should like to, and it may be that in subsequent issues we shall give the results of the progress in other directions. We believe that our readers will find the comparative tables given of value as well as interesting, and the reasons given for the success attained in each case worthy of careful study.

## NO "TRANSOCEANIC DANGER."

NOW that the echoes awakened by the famous speech of Count Goluchowski, the Austrian Minister of Foreign Affairs, to the Hungarian Delegates have nearly died away, it may be possible for business men to get a clearer idea as to what the Austrian statesman meant, and also to judge for themselves whether or not his position is sound. It will be well in the first place to recall the concluding and significant portion of the speech:

"A turning point has been reached in European development which calls for the unremitting attention of the Government. The great problems of material welfare, which have become more pressing every year, are no longer a matter of the future, but require to be taken in hand at once. The destructive competition with transoceanic countries, which has partly to be carried on at present, and is partly to be expected in the immediate future, requires prompt and thorough counteracting measures if the vital interests of the people of Europe are not to be gravely compromised. We must fight shoulder to shoulder against the common danger, and must arm ourselves for the struggle with all the means at our disposal. Just as the sixteenth and seventeenth centuries were absorbed by religious wars, the eighteenth century was distinguished by the triumph of liberal ideas, and our own by the appearance of the nationality questions, in like manner the twentieth century will be for Europe a period marked by the struggle for existence in the politico-commercial sphere. European nations must close their ranks, in order successfully to defend their existence. May this be realized everywhere, and may the epoch of peaceful development we now confidently anticipate be employed in collecting our strength and devoting ourselves chiefly to this end."

With few exceptions the press, both in Europe and America, agree that this passage refers to America. The *Handelsblad*, Amsterdam, regards it as clear "that this is an economic declaration of war against the United States." The *Independence Belge*, Brussels, one of the ablest papers in Northern Europe in its treatment of foreign news, not only holds this view, but adds that Austria must have sounded the other members of the triple alliance before uttering a threat against the United States. The majority of the German and English papers also see a political significance in the speech.

We have devoted considerable space to Count Goluchowski's remarkable utterance because it appears to us that it, as well as much of the discussion that it provoked, is based upon a grave misapprehension of the attitude of America toward Europe, and the nature of the economic problems involved. The distinguished Austrian, in the first place, finds that American competition is "destructive," likely to "gravely compromise the vital interests of the people of Europe." He then proposes as the remedy a vast commercial war, a sort of twentieth-century crusade against the common foe. It will be worth while for every business man who has dealings with America, or who engages in international commerce generally, to decide exactly what he thinks of these two propositions.

That the competition of the United States, and to an equal degree that of India, Australia and Russia, is bearing hard upon



the agrarian classes of Central Europe we do not doubt. But a readjustment here was inevitable. The day of small farms worked with old-fashioned hand tools and archaic machinery is hopelessly past in Austria, as everywhere else in the world. But while America has largely brought this about, she has also brought to the European agriculturists the means of their salvation. With the best modern machinery and the most approved methods the land-owners can certainly hold their own with a competition handicapped by 5,000-mile transportation charges.

The very progress of civilization is bringing about a fundamental change in the relation between agriculture and other industries that, while undoubtedly working temporary hardship to many individual agriculturists, is certainly to the great ultimate advantage of all alike. In every civilized country in the world labor is drifting steadily from the country to the towns, from agricultural to industrial or commercial pursuits. This is not because the world has less need of the product of the farms. On the contrary, it never lived as well as now. It is because the progress of invention, the advance in methods, the improvements in transportation facilities, that make the present century notable, have all combined to reduce the cost of production in agriculture, and to set free vast quantities of labor formerly required to produce or procure the world's daily food. This free labor is quickly absorbed in the busy towns, and finds employment supplying demands that but for the general increase of prosperity never could exist. A thousand things are necessities to-day, even in the laborer's house, that were undreamed of when it took all the world's time to get enough to eat and drink and wear.

The governments of Europe might as well consecrate the twentieth century to a united effort to make water run up hill as to combine in resistance to this decline of agriculture, as compared to other pursuits, for it is the result of forces as powerful and sure as gravitation.

American competition has recently entered the European market for machinery and manufactured products, possibly to the temporary discomfiture of a local manufacturer here and there. But certainly the European governments should be the last to protest because their manufacturers are equipping their shops with modern labor-saving machinery, or are adopting tools of improved types or finer finish. Their equipments once complete these manufacturers can snap their fingers at foreign competition. In certain lines it may be found that we have a permanent advantage, both as regards price and quality. It does not necessarily follow that the loss of trade in these lines will be a national misfortune. If an American firm can build a bridge across the Danube cheaper than any Austrian firm can build it the whole Austrian people gain in taxes saved, while the local firms are perfectly free to improve their plants so as to compete successfully another time.

Thus far we have been speaking of simple and natural means of meeting competition, without resorting to the clumsy expedient of commercial war. There is nothing necessarily "destructive" about American competition; on the contrary, "transoceanic" inventions are as completely at the service of the European agriculturist or manufacturer as of the American. If it appears to the statesmen of any country that the imposition of a tariff will foster the growth of some industry, for the success of which domestic conditions are favorable, the United States should be the last to protest. But we fail to see the slightest possibility of advantage to any party in a mere tariff war. In such a contest each country refuses the good things of the other because it can only produce them more expensively itself. So far from being, as Count Goluchowski pictures it, a logical step of progress from the development of the sixteenth, seventeenth, eighteenth and nineteenth centuries this would be a return to the policies of the fifteenth.

We believe that the twentieth century has better things in store for both Europe and America than such a miserable contest. The present century has seen one great continent almost completely reclaimed and developed. To Europe, where the arts of civilization have been engaged for centuries in reducing natural forces to the service of man, must now be added North America, where the

energy and intelligence of a population drawn from every nation in Europe, aided by labor-saving inventions such as the world never saw before, have conquered an area ten times as vast in a tenth as many centuries. Already a thin fringe of civilization surrounds Africa. Australia, South America, and even Russia, but partially developed, reveals far greater possibilities for the future, while Asia appears to be on the brink of an awakening that will bring its enormous natural resources as never before into the service of mankind.

In this vast field there is room enough for all, work and riches enough for all, need of all. Europe will welcome the experience and inventive intelligence of Americans in solving problems similar to those that confronted them in their own land in these widely scattered fields. America will welcome European capital and commercial organization. Each can bring elements of strength to the common stock. We believe that the twentieth century will be an epoch of commercial and industrial development of the magnitude of which we of this day can hardly have a conception. The world is on the threshold of discoveries and inventions of far-reaching importance, even as it is on the borderland of regions teeming with natural resources all but untouched.

In this great work there should be, and we believe there will be, no room for national jealousies or differences. Europe has no grounds for hostility toward America, no reason to "form shoulder to shoulder" against America. As commerce broadens it tends inevitably to bring about clearer understandings and wider sympathies. As the business men of Europe and America come to know one another better, and to join forces to obtain mutual benefits in distant lands, it will become the study of statesmen not to devise measures of commercial war, but to secure for all the fullest benefit from universal peace.

#### THE GREATER CITY OF NEW YORK.

WITHOUT question the most notable event on this side of the water during these first days of 1898 is the birth of the new city of New York, vastly larger, richer and more powerful than the old city of the same name. Strictly speaking, all that has been done is to consolidate under one municipal government all of Manhattan Island, on which New York proper stands, and a considerable area of territory contiguous to it, including Brooklyn and numerous smaller cities and towns. But while this event does not perhaps merit all of the attention that has been given to it by the American and particularly the local press, it is none the less an interesting one and affords an excellent opportunity for a general taking account of stock.

On another page will be found a few facts and figures about the greater city. It has not been our purpose to attempt any exhaustive treatment, for that would be manifestly impossible in the space at our disposal. Comparative tables giving the statistics of former years were unnecessary, since the expansion has been so vast. When, in 1614, the first child of European parentage was born on the island of Manhattan, London was, as now, the largest city in the world and a centre of art, science, industry and commerce. In 1800 New York, although already the chief seaport of the infant republic, was little more than an overgrown provincial town. An expansion from 50,000, which was about the population in the entire region now included in the greater metropolis, to 3,388,000 in less than a century, is an achievement without parallel in the history of the world.

Doubtless a large share of this immense growth is due to natural causes, to the central position of the city, midway between the North and South, to its unrivalled harbor and position as the natural gateway of the New World. But much is also due to the untiring energy and sagacity of its inhabitants. Virtually New York has been the second city in the world for several years, since all the business of the neighboring cities now incorporated was due to their proximity to the great metropolis. Now that it has become the second in name, as well as in fact, its importance and resources are presented in a truer light.



## MODERN PRIVATEERS.

IN years past one of the most destructive features of war upon the sea was the depredation occasioned by private vessels sailing under the express sanction of government and officially authorized to prey upon the commerce or ravage the coasts of hostile States. The spoils of such enterprises were officially appraised and sold and the bulk of the proceeds was divided among the owners and crews of the vessels winning them. This spoils money, together with the booty that never found its way into the prize court, presented an enormous inducement to men of adventurous instincts to enter the profession of privateering in time of war, and as a consequence the commerce of nations engaging in hostilities was practically driven from the seas. The civilized nations of the world have now agreed, however, to do away with this barbarous practice and to consider privateers as nothing more or less than pirates, which indeed they were in fact, though not in law, all along.

But, although the better instincts of mankind approve of the doing away of privateering on the seas, and the severe penalties decreed and enforced have now utterly abolished it, there still remains a form of privateering on dry land that has not as yet been entirely broken up. The modern privateers, moreover, are permitted to prey under sanction of the law upon the commerce of friendly nations with which their governments are at peace. THE EXPORTER has had occasion more than once to speak of the form of privateering in question. We refer to the practice of seizing, with or without warrant of law, the inventions and mechanical improvements of other nations and placing them upon the market in defiance of the interests of the original inventors or their authorized representatives.

It is not our present purpose to criticise the policy of any particular nation or nations in this matter. Without doubt all, including our own, are more or less to blame. And we realize that in all a great advance has been made and is still making in the direction of recognizing and protecting the rights of foreign inventors by international patents. Nor are we concerned just now with the interests of the original inventors. The stronger manufacturers are increasingly able to protect their own interests.

The point that we wish to urge in connection with these privateering concerns—of whatever nationality—relates rather to the interests of the buyer and consumer. Such competition is a two-edged sword and cuts both ways. The buyers are defrauded in many instances as well as the rightful manufacturers. For example, the latest consular report from one of the largest countries in Europe—a country in which American manufactures enjoy a long-established and well-merited reputation—informs us that these markets have recently been invaded by a host of concerns offering imitations of the articles whose merit first won this reputation. Not content with this, many of these firms even go so far as to stamp their inferior goods “American,” and copy the trademarks or firm names of well-known American manufacturers.

Doubtless in time the manufacturers will be able to put a stop to all this and demonstrate their ability to take care of themselves. They may even secure punitive damages that will repay them in a measure for their losses. But for the consumer there is no recourse. He has been cheated—the money he has paid in the expectation of getting a superior article has been thrown away—and that is all. Frequently this is a very serious matter. A firm investing thousands of dollars in expensive machinery, designed to meet the needs of a modern manufacturing plant for many years, would not knowingly purchase imitations of models superseded years ago by simpler and more effective designs. The merchant who offers, for example, an “American” sewing machine to his customer is not pleased to be informed that the machine has belied the reputation of twenty years and a million successes and proved itself a mere imitation of the article whose name it bears.

Moreover, it is clear that the privateer is not to be trusted. A firm that will not scruple to appropriate inventions and trademarks belonging to others will not hesitate to debase the quality of its product for added profit.

Buyers cannot be too careful in their examination of goods to see that they are genuinely what they purport to be, and cannot insist too rigidly upon getting the latest and best in whatever direction their purchases may lie. In no field is this more important than in the purchase of machinery, but in every field buyers should avoid the privateer as the merchantman of old did the black flag upon the high seas—for his mission in commerce is a hostile one to both parties in all honest trade, to those who buy as well as to those who make and sell.

## SOME RECENT IMPORTANT ELECTRICAL CONTRACTS ABROAD.

THE year just closed has more than maintained the record of increasing exports in American electrical supplies established in preceding years. More than this, the numerous large contracts made abroad during 1897 render it now certain that even this satisfactory showing will be surpassed for 1898. Indeed, the indications are that the increase in electrical exports for the next two years will appear little short of phenomenal to those who do not take into account the successful work of American manufacturers during 1897, when many of the orders that will swell the showing for electrical exports during the next fifteen months were secured.

The steady growth of the export trade in electrical supplies is shown by the following table, covering the fiscal years ending June 30th from 1894 to 1897:

1894.....	\$1,534,277	1896.....	\$2,522,217
1895.....	1,912,771	1897.....	3,054,453

It will be seen that exports of this description have more than doubled during three years. The distribution of these exports is interesting, particularly with reference to the contracts already mentioned. The more notable purchasers from 1894 to 1897 were:

	1894.	1895.	1896.	1897.
United Kingdom.....	\$380,016	\$340,071	\$385,575	\$437,086
Mexico.....	110,864	223,951	315,277	284,714
Brazil.....	100,857	165,551	282,798	110,468
Germany.....	101,515	135,333	201,360	240,577
Quebec, Ontario, etc.....	170,885	109,443	159,375	261,104
France.....	79,329	157,625	158,733	298,133
Argentina.....	29,382	23,625	103,730	157,564
Japan.....	34,600	24,861	98,243	148,271
British Africa.....	3,359	17,651	94,541	180,389
Belgium.....	41,618	73,531	83,702	168,864
Cuba.....	143,501	94,149	54,238	30,376

These figures are exclusive of electrical machinery not classified separately from other machinery prior to 1897. A comparative table for the ten months ending October, 1897, will indicate with even greater completeness than the preceding table the destinations of our electrical shipments, and will serve to show that the rate of increase shown in the three preceding years is being maintained:

Destination.	1896.	1897.
United Kingdom.....	\$309,368	\$364,520
France.....	155,062	196,471
Germany.....	181,541	215,932
Other Europe.....	164,582	275,741
British North America.....	196,699	277,454
Central American States and British Honduras.....	61,372	71,627
Mexico.....	213,250	250,607
West Indies and Bermuda.....	77,343	102,470
Argentina.....	93,086	139,814
Brazil.....	197,536	96,566
Other South America.....	155,539	136,167
China.....	4,659	8,802
Japan.....	140,791	171,761
British Australasia.....	42,259	61,131
Other Asia and Oceania.....	42,616	64,426
Africa.....	188,961	190,341
Other countries.....	.....	114
Total.....	\$2,224,664	\$2,623,944

The exports of electrical machinery for the same ten months of 1897 were \$489,913. For 1896 the returns regarding electrical machinery were not separately classified by the Bureau of Statistics.

These tables will enable us to better appreciate the work accomplished by the American electrical manufacturers in winning foreign contracts during 1897. As such contracts are made with a great number of private concerns, and as the policy of these firms regarding publicity as to their outlook and plans differs widely, a complete list of even the more important contracts is impossible. That the aggregate amount involved, however, will be very large



indeed is evident. Some of the more notable thus far announced are given below:

The complete equipment of the Central London Electric underground railway, including rolling stock, power houses and electrical elevators, has been awarded to Americans. The system employed is to be the third-rail system now successfully used on several important systems in this country. The total amount of this great contract comes to nearly \$12,000,000, although of this sum only a part will be for the electrical equipment. It is worth noting that the contract for the electrical elevators, to be of extraordinary size and swiftness, was placed separately, but that it came to America with the rest.

The contract for the complete equipment of the street railways owned by the model municipality of Glasgow with electrical power and apparatus has come to an American firm. The officials of the successful company decline to state the amount of the contract, but as it includes cars, motors, wiring and power plant necessary to operate 70 miles of track it must be considerable. As there are at present but about 100 miles of electrical railway in operation in the United Kingdom, divided up among fifteen lines, each served with from 2 1-2 to 8 miles each, it can readily be seen that the Glasgow system will be the giant among English electrical railways. The same firm recently secured a contract to supply engines, dynamos, wiring, etc., for the street-lighting plant in Malaga, Spain. English machinery had been installed there, but is to be displaced by the more economical and modern American plant.

Another firm has contracts for supplying the power machinery for electrical railways in Dublin, Ireland; Edinburgh, Scotland; Madrid and Barcelona, Spain, and Sydney, Australia. The first four of these are for about \$500,000 each, and the last is for considerably more. This firm has thus far sent over \$1,000,000 worth of mining machinery, much of it electrical, to South Africa, and has orders for a great deal more.

It is reported that the electrical plant that is to light the City of Mexico will be ready about February 15th. This plant will furnish about 40,000 incandescent and 600 arc lights. It is now being shipped from New York. The same firm is understood to have contracts for lighting several other cities in Mexico. The Mexican Congress has approved a contract under which a New York house is to furnish for a period of four years all the supplies for the Department of Public Works of the Republic, including telegraphs, government railroads, post office and port improvements.

These are but a few of the more notable contracts called to our attention during the past year, the work on which will take place largely during 1898. We might give an almost interminable list of smaller plants, from electrical railway supplies for Lecce, Italy, power dynamos for the Japanese Government, to a lighting plant for the Tanjong Pagar Dock Company at Singapore. Altogether the outlook for the electrical export trade is the brightest in the history of the country, and there is every reason to believe that this splendid showing on the part of American manufacturers in this department is due to no spasmodic impulse or to any fortuitous circumstance whatever, but is the logical and deserved result of the intelligence and skill they have put into the development of their great industry and the uniform success with which they have solved every electrical problem presented to them all over the world.

#### HOW TO SEND EXPORT ORDERS.

EVERY man feels that he understands his own business the best and is apt to resist suggestions by "outsiders" as an impertinence, or at best as a well-meant but superfluous kindness. The problems of international trade are, however, so different from those of purely domestic trade, and frequently so intricate, that we believe that the readers of THE AMERICAN EXPORTER will not take it amiss if we venture to make an occasional suggestion as to the best methods of solving them. If our twenty years' experience will enable us to save some of our readers any needless inconvenience or financial loss we shall be glad to place it at their service.

The first question that presents itself to a buyer who reads an advertisement of an article he wishes to procure, or receives a price list enabling him to select intelligently, is how his order shall be sent. Shall he buy of the manufacturers direct, or through some commission merchant? We would reply that, in general, orders had best be sent to the commission merchant. The present age of economy in production, in transportation and distribution is increasingly jealous of the profits of the middleman. Every movement tending to eliminate him and to divide his profits between the maker and the final "taker" is welcomed on both sides. But while in domestic trade there is a great deal to be said in favor of this modern tendency, in all foreign trade new elements enter into the question and we very much doubt if the services of the export and import commission merchants can ever be profitably dispensed with.

The services of the foreign commission merchant are not confined to a mere forwarding of orders, as some seem to suppose. He does a great deal of real and necessary work, work that but for him would have to be done by some one else, and probably by some one greatly less qualified to do it well. And his services, moreover, possess an actual cash value—in money saved—that exceeds, and often very greatly exceeds, the fixed commission asked in payment.

Let us follow an order through its various movements and note the influence exerted by the commission merchant at each step. First there is a notable gain in simplifying correspondence. Every order goes to the same party as far as the foreign buyer is concerned, and a feeling of confidence and mutual understanding rapidly grows up that greatly facilitates prompt and satisfactory service. Moreover, every commission house is prepared as a matter of course to handle correspondence in the language of any country. The buyer need not put himself to the trouble of having his letters translated or of hiring a translator to read the replies. And orders for goods from a dozen manufacturers can be sent in a single letter without risk of being missent and without needless trouble in looking up detailed addresses.

These the commission merchant forwards to their respective destinations. In each case he sees that the contract with the manufacturer secures for his customer all the discounts to which the foreign buyer is entitled. This point alone frequently saves the amount of his commission and is liable to be overlooked in sending orders direct.

The next point to be attended to relates to the packing of goods for shipment. Manufacturers, when shipping direct, rarely inform themselves sufficiently regarding the peculiarities of each country in the matter of packing requirements. Frequently great annoyance and sometimes serious loss result from improper packing. The work may have been done carefully and well, but without regard to the exigencies of each particular case. The commission merchant is familiar with foreign conditions, and the peculiar requirements of foreign markets, and with a few lines of clear directions saves all inconvenience and loss.

In shipping, a commission merchant possesses several advantages. He may secure slightly reduced rates of freight transportation from inland to the seaboard, through familiarity with the routes or because of the volume of his shipments. He can then assemble the goods ordered by a single foreign buyer, though coming from a dozen manufacturers, and enter them on a single bill of lading. The volume of his business enables him to secure very large reductions in the steamship transportation rates, since his accounts with the company may include scores of separate shipments. Each individual buyer, however small, thus secures a rate usually accorded only to the largest shippers—another notable saving.

But the goods are not yet quite off and there is still another service for the commission merchant to perform. This is attending to the making out of proper manifests and consular invoices in accordance with the laws of the various countries to which goods are shipped. In this way all confusion and annoyance connected with the passage of the goods through the custom house at the port of entry are avoided. And since severe fines for neglect of these details are frequently exacted, here again the services of the com-



mission merchant may come to possess a cash value—in money saved.

There may be circumstances in individual cases where the services of the commission merchant can be dispensed with, but in general, it is our opinion that, except in the case of the very largest houses possessing their own agents at all important buying and shipping points, it is more economical as well as more satisfactory in other respects to order through the commission houses. It should be unnecessary to add that the house selected should be a responsible and capable one, one having large connections and a constant and considerable volume of trade with the buyer's country preferred. *THE AMERICAN EXPORTER* will be pleased to furnish the names of such houses to buyers if desired, since its publishers are in no way connected with the export commission business themselves.

One important point should be insisted on. The orders should in every case specify the name of the firm by whom the goods are to be manufactured, and buyers should insist on receiving goods of that make and no other. This is a matter of indifference to the honest commission house, while with unscrupulous agents an opportunity is otherwise presented for substitution to the injury of the buyer. We have on another page described the operations of a class of manufacturers who live by selling imitations of other people's goods. One of the easiest ways by which these "privateers," as we have called them, find a market for their wares is through unscrupulous commission merchants who substitute their goods for the genuine article ordered. We repeat once more, however, that if buyers exercise care and judgment in selecting their buying agents in foreign lands the experience and trained intelligence of the commission merchant will make him their surest and safest medium through which to obtain a satisfactory and profitable trade.

#### A PLEASANT INCIDENT.

THE evening papers of this city on the last day of last year contained brief references to a little incident that deserves more than a passing notice. They reported that the following greeting had been received by the New York Coffee Exchange: "The Hamburg Exchange wishes you a happy and prosperous New Year," and that an appropriate and cordial response had been sent.

This proceeding, happily, is by no means without precedent, nor was it, we believe, without parallel at the close of last year. But it may fairly be taken as a type, and as a token of international good will and friendliness. Particularly at this time, when the brightness of the New Year is so much darkened by war clouds in the Far East, are such incidents welcome. And perhaps Americans would not at this moment appreciate such an expression of good will more heartily from any country than from Germany, where the irresponsible and somewhat jingo press has been indulging of late in so many tirades against the United States apropos of the Goluchowski incident.

The message of the Hamburg Exchange serves as a reminder of a fact that is familiar to us all, but is sometimes overlooked or forgotten—that nothing tends so strongly to foster ties of international sympathy and good will as mutually satisfactory trade. The intelligent merchants of to-day are not content with merely sending an order for merchandise over sea or shipping the nearest thing in stock in response to a foreign order. They are striving to inform themselves by every means within their power regarding the condition of other lands, their needs, their resources, and the character of their people. Between great civilized nations such studies, supported by the contact that comes from actual trade, and still further reinforced by frequent visits between those who buy and those who sell, must inevitably result in a hearty spirit of mutual appreciation.

In a word, nations come to know one another better by means of the informing influence of commerce, and with better mutual understandings the danger from petty jealousies and prejudices is done away. The statesman who has his finger on the pulse of national sympathies will not be slow to realize the swelling influence

of this spirit and bow to it as far as possible. Even the demagogue will be less ready to plunge into harsh disputes as he begins to comprehend the increasing strength of mercantile opinion setting steadily against such action unless fully warranted by the crisis.

We cordially welcome, then, all such evidences of friendliness as that displayed during the closing hours of 1897, and we echo the sentiments of the New York Coffee Exchange as sent to Hamburg. May the New Year be a happy and successful one for the merchants of that busy city. And may it be prosperous, and peaceful as well, throughout the world, and may these proofs of international good will multiply.

#### THE LONDON FIRE.

THE recent disaster in London recalls vividly an incident of less than a year ago, on which we commented at the time. The London County Council was contemplating an increase in the fire-fighting equipment of the city. A proposal that bids from American firms to furnish steam fire engines should be invited "was received by the Council with a howl of disapproval." It is not our purpose to preach sermons or draw morals from the misfortune of a sister city. We cannot presume at this distance to pass upon the causes of the calamity which it may require months of expert investigation to determine. Possibly had American fire engines been present the extent of the conflagration would have been the same.

But every great fire cannot fail to emphasize the importance of incessant watchfulness on the part of all who are interested in the fire protection of a great city that the fire-fighting appliances at hand be kept abreast of the age. The selection of such appliances is not the place for the display of national jealousies. The best, whether made in America, in Germany, or in Timbuctoo, must be insisted on.

As civilization increases the danger from conflagration increases, in spite of the advance of invention in fireproof construction and fire-fighting apparatus. The property loss in the recent London fire, although it extended over but comparatively few streets, is estimated to have been greater than that in the famous London fire of 1649, which destroyed half of the city. Wealth is concentrated enormously in every modern city, and a few hours of a stormy night where there has been negligence in preparation might see an amount of property wiped out of existence that would be appalling.

Not only those nominally in charge of the fire departments of great cities, but all insurance companies and local business men as well, should see to it that the means of protection against fire are made, and kept as perfect as human intelligence will allow. Whether the order for a few fire engines goes to a domestic or a foreign firm is a very small matter compared to the risk of disaster through inefficient appliances and methods. Each city owes it to itself to have the best.

IT is reported from well-informed trade sources that an earnest effort now being made to have the embargo on Cuban tobacco imposed by the late Captain-General Weyler raised is likely to be successful.

We hope most heartily that this report is well founded and that steps may soon be taken, of which the removal of the embargo would be but the first, in the direction of a complete restoration of commercial activity at Havana. The commerce between Cuba and the United States has always been an important one, and one, moreover, the expansion of which Spain could regard with unmixed satisfaction, since not only was the balance of trade invariably in favor of Cuba, but those articles which formed the bulk of the American exports to the colony were of such a nature that Spain could not consider them as competing with her own merchants.

The removal of the embargo, indeed, will tend directly only to swell the volume of Cuban exports. But we are confident that with increased exports business of all kinds will revive and demands will be created that American merchants will be called upon to satisfy.

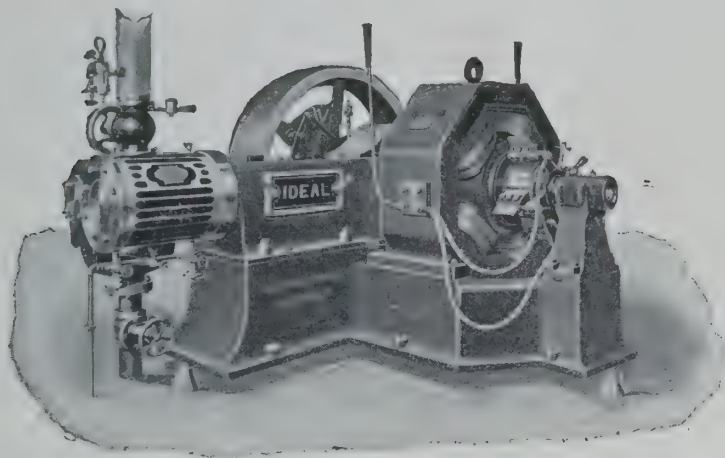


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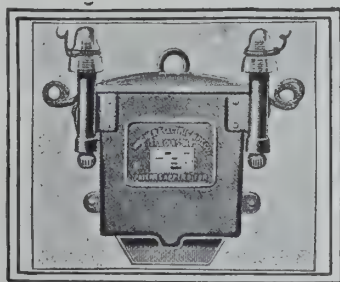
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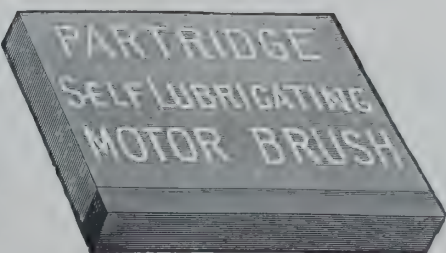
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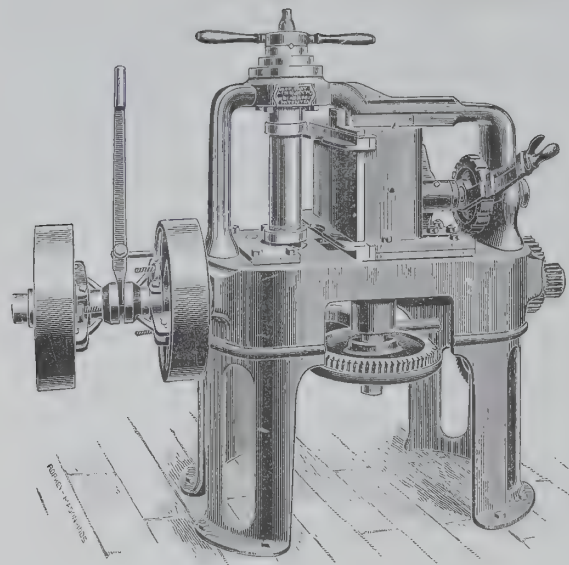
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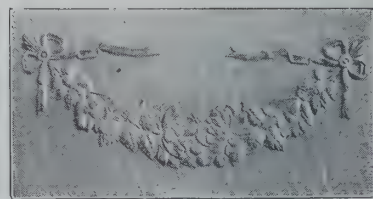
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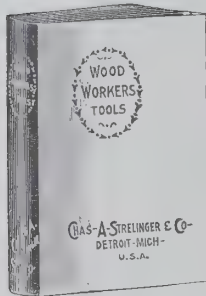
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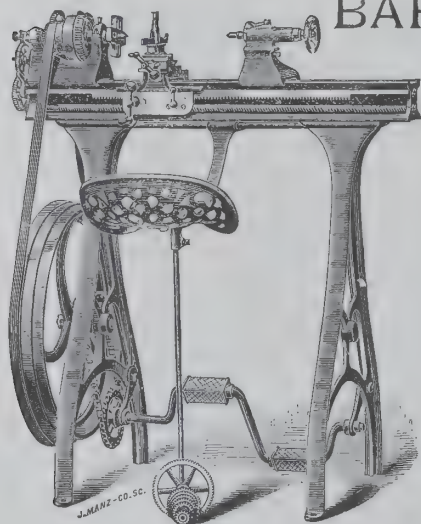
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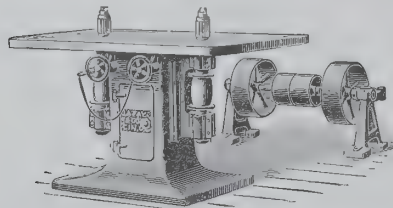
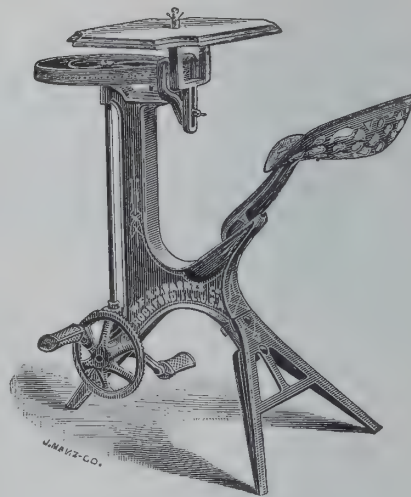
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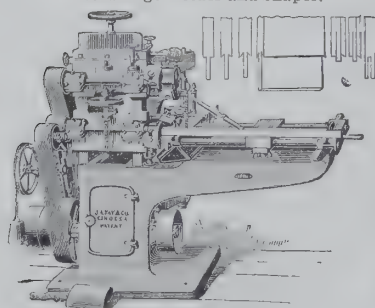
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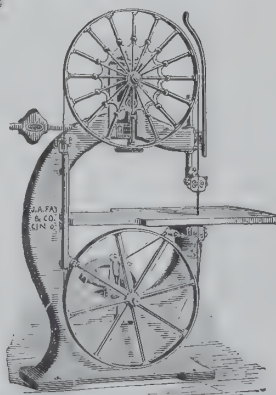
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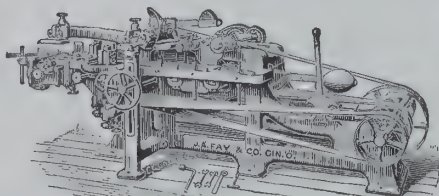


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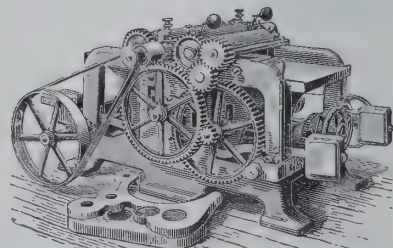
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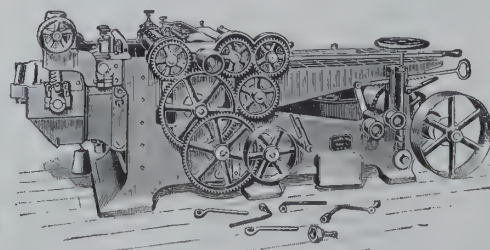
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## Exports for 1897.

A REVIEW of the foreign trade of the United States since 1890 shows that the exports of American products and manufactures averaged \$912,000,000 annually, while our imports of foreign goods averaged only \$772,000,000 a year, thus leaving us a trade balance that has averaged \$140,000,000 for each and every year from 1890 to 1897, inclusive. Our largest volume of exports was in the fiscal year ending June 30, 1897, but this is likely to be slightly exceeded by the returns for the 1897 calendar year, the average exports for the first eleven months, to November 30th, indicating a total export movement of \$1,063,000,000 for the calendar year just closed. This will be \$13,000,000 more than for the last fiscal year and \$30,000,000 more of exports than in 1892, the year that had held the record prior to 1897.

Since 1890 only once has the balance of trade been against us—\$18,737,728 in 1893—and the calendar year just closed is likely to be a "record breaker" in the matter of favorable balances, with a total of \$309,000,000, based upon the returns up to November 30th last, as compared with \$286,269,644 during the 1897 fiscal year. Our aggregate foreign trade, both imports and exports combined, was highest in 1892, and the returns for the year just ended will fall short of this amount by about \$40,000,000. But 1897, upon the balance of trade theory, will be the more satisfactory year for American interests, our books of national commerce showing nearly \$310,000,000 to our credit as compared with \$202,000,000 in 1892. The figures in detail follow:

## OUR IMPORTS AND EXPORTS.

Year Ending June 30th.	Exports.	Imports.	Total Exports and Imports.	Excess of Exports.
1890 .....	\$857,828,684	\$789,310,400	\$1,647,139,093	\$68,518,275
1891 .....	884,480,810	844,916,196	1,729,397,006	39,564,614
1892 .....	1,030,278,148	827,402,462	1,857,680,610	202,875,686
1893 .....	847,665,194	866,400,922	1,714,066,116	*18,737,728
1894 .....	892,140,572	654,994,622	1,547,135,194	237,145,950
1895 .....	807,538,165	731,969,965	1,539,508,130	75,568,200
1896 .....	882,606,938	779,724,674	1,662,331,612	102,882,264
1897 .....	1,050,987,253	764,717,609	1,815,704,862	286,269,644
†1897 .....	974,612,895	691,091,090	1,665,703,985	283,521,805

† Eleven months, to November 30th. \* Excess of imports.

## 1897 a Notable Year for American Machinery.

ALTHOUGH the total returns of our export trade in machinery for the 1897 calendar year are not yet completed, they are important enough to warrant a comparison with similar exports for 1890, thus:

## EXPORTS OF AMERICAN MACHINERY.

	Year Ending June 30 1890.	Ten Months to Oct. 31, 1897.
Agricultural Implements—		
Mowers and repairs.....	\$2,092,638	\$3,095,812
Plows and cultivators.....	878,784	482,038
All other .....	887,702	1,424,431
Iron and Steel—		
Printing presses.....	317,336	575,874
Locomotives.....	1,280,606	2,747,077
Stationary engines.....	305,478	311,517
Boilers and parts .....	570,915	527,916
Car wheels .....	103,782	118,751
Castings.....	653,102	718,260
Steel rails .....	315,081	2,270,383
Wire.....	780,222	1,971,133
Cars, passenger and freight.....	2,689,698	1,159,773
Shoe machinery .....		267,602
Electrical machinery .....		489,913
Metal-working machinery.....		1,328,516
Pumps and pumping machinery.....		638,840
Structural iron and steel .....		413,622
Tools .....		1,934,860
Other machinery .....	8,964,776	14,044,690
Totals.....	\$19,830,120	\$33,410,008

The ten months of last year showed 70 per cent. larger exports of American machinery than in the full fiscal year ending June 30, 1890, and the total exports for last year will be more than 100 per cent. in excess of the 1890 exports. The principal growth has been in mowers and reapers, steel rails, locomotives and wire. Besides these the exports of shoe, electrical, metal-working and pumping machinery have increased so largely that they are now specified in detail, whereas they were formerly included in the general classification of "other machinery."

The harvesting machinery interests alone cover a history of a hundred

years of successes and failures. More than 8,000 patents have been granted for improvements in reapers, mowers and binders.

Of machine tools we are now sending abroad more than \$2,000,000 worth a year. Orders are now received weekly from England, France, Germany, Belgium, Holland, Norway and Sweden for bicycle-making machinery and appliances for general manufacturing, and are not infrequently received from China, Japan, South American countries, Australia, and occasionally from India and Africa.

England has taken sewing-machine machinery freely from the United States, and gun and other machinery in a small way, for twenty years. It has bought machinists' small tools of American manufacture very generally for the same period, and the cost has been less than that for similar English made tools, notwithstanding freight charges. This is due mainly to the fact that an American workman, paid American wages and using American machinery, can turn out his finished product in much less time than the cheaper-paid foreign workman. This is particularly noteworthy in connection with a locomotive, that can be built in the United States by the labor of one man in 1,400 days, whereas the locomotive built in England by one of the largest manufacturers requires the labor of one man for 3,700 days, and the American locomotive is both larger and stronger than the English one.

Paper mill machinery is also being exported now, as well as paper, Japan being a good customer in both these lines. A trainload of paper machinery was shipped to the Fuji Paper Company in the Spring of 1896. A large shipment was made to the Oji Paper Company in March, 1897, consisting of eight horizontal turbines and four large wood-pulp grinders, two of the latter machines being shipped at the same time to the Yokkaichi Paper Company. The president of the Oji Paper Company, Mr. Okawa, has made a life study of the manufacture of paper, having spent several years in Germany, England, Norway and elsewhere. After thoroughly investigating their methods of manufacture and machinery used, he stated that he was thoroughly convinced that the Americans led the world in the manufacture of paper and pulp, and that their machinery was far ahead of any other he had seen.

## The Typewriter As an Element in Business Competition.

A LETTER from a leading Australian merchant was published not long ago in the London Times, in which he warned the mother country that American merchants were rapidly occupying fields formerly regarded as the exclusive property of English exporters. The writer laid especial stress upon the superiority of the American method of doing business. One very notable difference will be of interest. The English manufacturers are still holding to ordinary writing in correspondence. The letters are frequently almost illiterate, and as often written by subordinates. He contrasts the American manufacturer's way by which all letters are dictated by the principal of the firm or head of a department and written on the typewriter.

## Some Facts and Figures About "Greater" New York.

THE history of New York fills many large volumes, and no attempt even to give a summary of it is possible in the space at our disposal. A few significant dates, however, may suggest much that cannot be given even in outline. On September 2, 1609, Hendrik Hudson, an English adventurer in Dutch pay, sailed past the Highlands of the Navesink in his little ship, the Half Moon, and entered what is now the Harbor of New York. He and his followers were the first Europeans to set foot on the shores of this portion of the new world. In 1610 a Dutch expedition was sent out to open a fur trade with the Indians, and four years later a few rude log cabins were erected on Manhattan by the traders. In 1624 a permanent settlement was effected and the colony named New Amsterdam. Two years later occurred the celebrated purchase of Manhattan Island, on which New York now stands, from the Indians by Peter Minuit, the first director of the colony. The price was \$24. Considering that there were 13,487 acres in the lot, this was cheap. In 1664 New Amsterdam was conquered by the English, and although retaken by the Dutch in 1673, the Dutch rule came permanently to an end in 1674, and the name of the colony became New York, in honor of the Duke of York, brother of the King of England. During the Revolution New York was occupied by the British, who made it their headquarters. It was evacuated by them November 25, 1783, which date is still celebrated in the city as "Evacuation Day." Here Washington resigned the command of the Continental Army, and here also he took the oath as first President of the new United States. In 1820 the population of New York passed the 100,000 mark. The growth in population and commerce during the next forty years was marvellous, the city reaching in 1860 a population of 800,000, while in commerce it had far outstripped every other American city. During the next thirty years this mighty total was more than doubled, while the present greatness is best told in the figures below.

The Act of Consolidation was the outgrowth of an active movement of more than seven years' duration, of which Mr. Andrew H. Green, now sometimes called the Father of Greater New York, was the most active champion. There was considerable opposition, particularly in Brooklyn, but the act was finally passed and signed May 11, 1896. Its important passages read:

Section 1. All municipal corporations and parts of municipal corporations,



other than counties within the following territory, to wit (a detailed list of counties and towns to be consolidated follows), are hereby consolidated with the municipal corporation known as the mayor, aldermen and commonalty of the city of New York.

Sec. 6. Section 1 of this act shall take effect on the first day of January, in the year eighteen hundred and ninety-eight.

The other sections related to the appointment of a commission to devise a charter for the new city. This charter was signed May 5, 1897, and became a law January 1, 1898. The commission consulted the best expert opinion in America on municipal government, and the result as embodied in this charter is believed to be as good a working instrument of government as can at present be devised for a city so vast and presenting such varied and difficult problems. The systems in operation in London and the other capitals of Europe were carefully studied, as were those in many other large cities, notably Glasgow, from whose municipal policy several hints were taken.

The newly created municipality is divided into five boroughs, designated as Mahattan, comprising the present city of New York; Bronx, comprising all the territory to the north of Manhattan but west of the East River; Brooklyn, with the same boundaries as the former city of that name; Queens, including the remainder of the territory on Long Island consolidated with New York by the act, and Richmond, comprising the whole of Staten Island. Each of these is to have home rule for exclusively local matters. For the government of the consolidated area in matters of general concern the charter of the Greater New York arranged for the election of a mayor, a controller, presidents of the various boroughs and two houses of municipal legislature, a municipal council and a board of aldermen.

First among these elective officers is, of course, the mayor. It has frequently been asserted during the past few months that next only to the President of the United States the mayor of Greater New York will be the most important elective office in the gift of the people of America, and there is much to show that the statement is not an exaggeration. The mayor is elected for a period of four years, and is to be paid a salary of \$15,000 per year. He may not be a candidate for re election for the term immediately succeeding that during which he has served. To him is given the appointment of the heads of departments and commissioners, and to him is given also the power to remove from office during the first six months of his term of office any public officer, excepting only members of the judiciary and members of the board of education, these not being appointed by him. At the end of the six months he may remove appointees from office only when charges have been brought and the accused has been given an opportunity to be heard, and even then the removal from office must meet with the approval of the governor, expressed in writing. Should charges against the mayor himself be submitted to the governor, the latter has power to suspend the chief officer of the city for a period not exceeding thirty days, pending an investigation conducted by the attorney general, and should the charges be substantiated he may remove the mayor from office. Should the mayor veto any ordinance or resolution passed by the municipal assembly it will require the vote of five-sixths of the members of both the council and the board of aldermen to pass such a resolution over the veto provided that an expenditure of money be involved, and of two thirds of the member, even if this be not the case.

We have dwelt for a moment upon the powers of the mayor because, such is their extent, he is virtually the government. Every department of the administration is placed under a commission appointed by and responsible to him alone.

This concentration of power carries with it a concentration of responsibility, and this was the design of the charter commissioners. The controller, elected directly by the people, acts as a check against reckless expenditures. And, as in all American governmental schemes, the legislature and judiciary are independent of the executive. The charter provides a number of safeguards against the abuse of power by the municipal legislature, prominent among which are clauses forbidding the lease of franchises for terms exceeding twenty-five years.

The inauguration ceremonies on January 1st were exceedingly simple. Mayor-elect Robert A. Van Wyck, who is descended from one of the oldest families in the United States, his ancestors having been burghers of the New Netherlands, came to the City Hall in a cable car. His inaugural speech was, perhaps, the shortest on record, and was as follows: "I accept the trust imposed in me by the people, and to them I will answer."

The total population over which Mr. Van Wyck has been called to rule is about 3,400,000, divided by boroughs as follows:

Manhattan.....	1,884,436	Richmond.....	64,081
Brooklyn.....	1,180,000		
The Bronx.....	135,116	Total.....	3,388,884
Queens.....	125,201		

Its total area is 193,850 acres, or about 820 square miles, as compared with only 74,672 acres claimed by London, 19,279 by Paris and 15,662 by Berlin, in spite of which a section of thirty-two acres of the territory of Greater New York, in the Borough of Manhattan, is the most thickly populated spot on the surface of the globe. The New York of to-day contains as many people as were in the whole of the thirteen colonies when they declared their independence.

One of the most striking points about the population of New York is its cosmopolitan character. It has been said that New York is the largest Irish city in the world, the second largest German city, and so on. The statistics bear these statements out, although the figures will be misleading unless the reader takes into account the immense assimilative power of American life.

The Germans, Irish and the rest prove to be loyal, liberty-loving Americans with a hearty pride in the country and city of their adoption:

Germans.....	890,000	Italians.....	101,000
Irish.....	851,000	Scotch.....	50,000
English.....	170,000	Canadians.....	23,000
Russians.....	103,000		

These are but a few of the nationalities represented in a city where it is said that one can always find some one from his own town if he but cares to hunt him up.

The public property of the greater city is valued at \$360,187,928. The total assessed value of real estate within its borders is \$2,377,277,820. Its total net indebtedness is stated to be \$232,112,928.79 and the budget for 1898 is \$62,920,882.44. The number of the new city's employees will go beyond 30,000, an army of workers larger than the Regular Army of the United States. Of this number it is estimated that over 6,500 will wear the uniform of the police and about 4,000 will be clad in the white of the street-cleaners' brigade. Leaving out of the question the hundreds of thousands employed by retail firms in the Greater New York it is discovered that nearly 600,000 persons gain their living in wholesale and manufacturing concerns within the city limits. Estimates place the amount of capital invested in manufacturing in New York at rather more than \$600,000,000. The value of the goods manufactured is over \$1,000,000,000 annually. One hundred years ago the total export and import trade of the United States was below \$50,000,000 a year. At present it is over \$2,000,000,000, of which imports reach \$900,000,000 (specie being included). Two thirds of these imports are received at the port of New York, and from the same port are dispatched two-fifths of the total exports.

To illustrate what the banking facilities of the Greater New York are it may be stated that on January 1, 1898, according to the latest reports available at the Clearing House, there were sixty-four associated banks in the city having a combined capital and surplus amounting to \$133,200,000, with deposits aggregating \$669,000,000, loans of \$610,000,000, and they have in their vaults a cash reserve of more than \$100,000,000 of gold and \$75,000,000 of United States currency. These banks, however, only represent a part of the banking facilities of the new city. Besides the associated or Clearing House banks there are some fifty other banks in Manhattan, Brooklyn and Long Island City whose combined capital and surplus is \$14,000,000, and which have deposits aggregating more than \$55,000,000 and whose loans exceed \$50,000,000. But that is not all. In addition to the banks there are eighteen trust companies that also do a banking business whose capital and surplus amount to more than \$60,000,000 and which have deposits aggregating more than \$250,000,000.

The record of the savings banks, one of the best indicators of prosperity, at the time of consolidation was as follows:

	Deposits.	Surplus.
New York.....	\$380,152,974	\$44,156,848
Brooklyn.....	112,182,277	16,245,960
Total.....	\$492,335,251	\$60,402,808

The exchanges at the Clearing House for last year reached the enormous sum of \$29,350,894,883.87, while the balances alone amounted to \$1,843,289,223.66.

The harbor of New York is deservedly famed as one of the finest in the world, there being ample room in the broad lower bay for all the navies of the world. The total water front of the present city is 353 miles, a large part of which is within the Narrows and available for commercial purposes. In 1896 a commission was appointed to improve the dock facilities on Manhattan Island, and as a result of their labors the city will soon have sixteen large new piers in the heart of the commercial section and over five miles of additional wharfage room will be created. The new piers, which are to be ready this Spring, are to be longer and wider than any yet built. They are the property of the city, and all of them are already leased.

The greater city has 1,200 miles of streets, of which 1,002 are paved. Beneath these are laid 1,156 miles of sewers, while above there are 531 miles of surface railways and 64 miles of elevated. It is claimed that the first street railway in the world was chartered in New York. The cars resembled old-time stage coaches, were balanced on leather springs and had doors at the sides like the present-day railroad coaches in England.

The present dimensions of this traffic are shown by the following figures:

Capital invested in various street lines.....	\$95,000,000
Number of cars used.....	5,082
Number of passengers carried each year.....	480,000,000
Average number carried each day.....	1,300,000
Number of locomotives in use of elevated roads.....	473
Number of passenger coaches used.....	1,590
Number of passengers carried each year.....	100,000,000

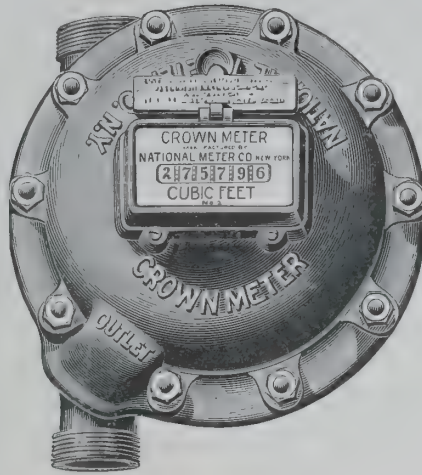
It is stated that the Manhattan Railroad alone has carried nearly 3,000,000,000 passengers since it was organized, of which immense number only one died from injuries received while travelling.

It is stated that the new city contains 167,000 buildings, of which 130,000 are used for residences. Foreigners frequently remark one peculiarity of the buildings in the business sections, namely, their extraordinary height. A vast number of buildings used for offices and warehouses are ten, twelve and fifteen stories in height. Recently a steel skeleton style of architecture has been adopted, in which the masonry only serves to protect the building from wind and weather, the steel carrying all the weight. Now buildings are run up to twenty and even twenty six stories in height, and a near neighbor to the Bennett Building, the home of THE AMERICAN EXPORTER, is now being built that will be twenty-nine stories in height—382 feet above the ground. These structures are not built because any one supposes them to be ornamental to the city—



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GENTLEMEN:

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Yours very truly,

J. C. CUSHMAN.  
Chairman of Water Committee.

**They increase the revenue,  
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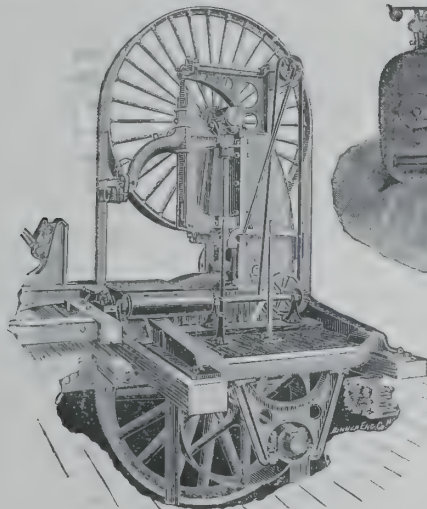
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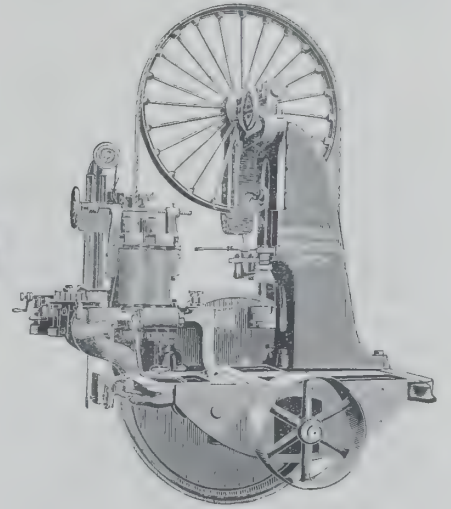
**BAND RE-SAWS**—For Saw Mills. Increase largely quality and quantity of daily output

**STEAM-ACTING SAW MILL APPLIANCES.**

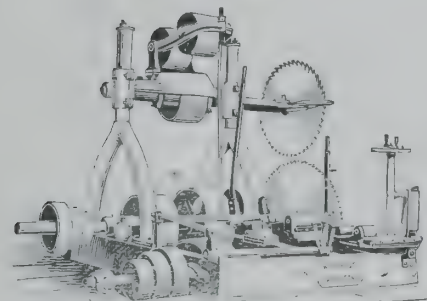
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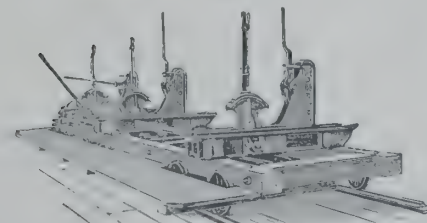
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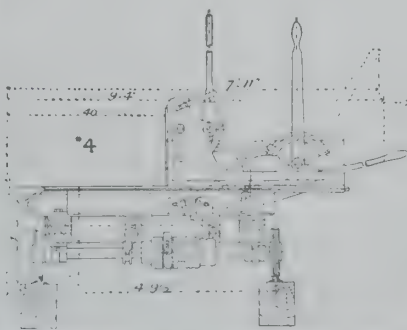
Band Re-saw.



Saw Frame No. 3.



No. 5 Log Carriage.



No. 4 Carriage, showing Off-set for Band Saw.

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although they certainly give it a most striking sky line—but partly because the price of ground is excessively high in the districts where they stand and because they have been found convenient. Swift and safe elevator service brings all floors into equal communication with the street, so that every office possesses the advantageous position of the street door.

Many other points occur that might be discussed at length, the 6,587 acres of parks, the 330,000,000-gallon water supply and the wonderful aqueduct by which it reaches the city, the scores of vast bridges spanning the Harlem River and the world-famous Brooklyn Bridge, spanning a mile of the East River and uniting the great boroughs of Manhattan and Brooklyn, the Statue of Liberty in the lower bay and so on in an endless chain. But our space is already more than full. Perhaps before long we shall describe the new East River Bridge now building and the North River Bridge soon to be built that will connect New York with two large cities not included within its limits—Jersey City and Elizabeth, with 200,000 inhabitants.

One little point we may add in closing, for whom it may concern: Letters addressed to firms in the city of New York as it was will reach their destination if addressed "New York" as before, although "Borough of Manhattan" might be added if desired. Letters to Brooklyn will undoubtedly reach their destination if addressed as formerly, but to be correct the address should be "Borough of Brooklyn, New York." The designation "Greater New York" is not the name of the new city, although it is so often applied to it. Its correct style and title is simply "New York," as before.

### American Machinery in Austria.

M. R. EMIL MARITSCHKE writes from Vienna to the *Iron Age* that on recently visiting several of the most prominent Austrian shops he found almost everywhere some American machines, and when some workman or superintendent was questioned he, almost without exception, spoke highly in their praise. No bicycle machinery is made in Austria; all is purchased from the United States or Germany, where two or three concerns are making a specialty of this line.

The sale of American milling machines in Austria is largely assisted by the vertical attachment. Gear-cutting machines of American origin are almost universally used. American shapers have a ready sale, but planers rarely reach the inland districts of Europe, as transportation is costly. Boring and turning mills are yet to be introduced; turret lathes are of German origin but American styles are regarded favorably. One American maker of sheet-metal presses has met with much success, while the American woodworking machinery is in high favor. The demand for small American tools, like pliers, wrenches, twist drills, chucks, die stocks and a good many more, has been growing year by year, and reaches at present a somewhat enormous total. Some of these articles are almost exclusively purchased from America.

### Denver a Great Mining Machinery Centre.

THE following article, appearing as it did in a leading English trade paper, in the form of a letter from a regular correspondent, is a notable recognition of the superiority of American machinery and machine-making methods. It would be only fair to add, however, that there are other mining machinery centres in America besides Denver. Chicago, for example, is a very important one, and it is claimed that in the production of heavy mining machinery the great Chicago manufacturers lead the world. This, however, does not detract from the force and truthfulness of what the able writer of the following article says.—EDITOR.

Denver is the geographical and railroad centre of the great mining regions extending from British Columbia to Southern Mexico, and is increasingly the mining machinery centre (subject to division with San Francisco) of the same vast extent of country. Although the city was only founded in 1859, and the first railroad only reached Denver in 1870, the first mining machinery works there date back to 1860. From that time Denver has steadily forged to the front as a mining machinery centre, until now she holds first place, both as to quantity and unquestionable quality of product.

To-day Denver has 165,000 population; is the Eastern gateway of the gold mining region of the United States; and is the hub from which radiate railroad systems aggregating over 26,000 miles in length, tapping all such gold mining sections. There are nearly twenty firms, large and small, in Denver manufacturing mining machinery and supplies, with nearly 1,000 men on their pay rolls, and several large concerns simply handling such articles. Some of these carry a considerable stock on hand, ranging in value from \$10,000 to nearly \$100,000, in addition to undertaking at short notice to manufacture and supply anything which could not be kept in stock.

For instance, Denver firms build and supply smelters, sampling works, stamp mills, concentrating mills, amalgamation mills, cyanide plants, slag trucks up to 60 feet cubic capacity, ore cars, ore buckets, engines, boilers, pumps, water pipes, and in fact everything connected with mining and milling. Some of the articles kept in stock are from Eastern factories, where they can at present be produced at less cost. As a sample of things not kept in stock, one Denver firm has just manufactured a chlorination barrel with a capacity of 12 tons, the outside shell being of 9-16th's steel, and the lining of sheet lead, 24 pounds to the square foot. A mine owner can come into the Denver market and get at once almost anything he requires (say) 4 or 5 miles of a certain size of wrought-iron pipe, boilers and engines from 1 horse-power to 125

horse-power, hoisters from 8 horse-power to 80 horse-power, all in stock and ready for immediate delivery.

The extent to which Denver is a mining machinery centre is illustrated by a brief and partial list of recent contracts and shipments (exclusive of Colorado business) made by a single firm in Denver, as follows:

A smelter for Mexico.

A smelter for Arizona.

A roller ore-crushing mill for South America.

A roller ore-crushing mill for South Carolina.

An aerial wire tramway for British Columbia, 6,200 feet long, with a fall of 2,100 feet in that distance, or 1 foot in 3.

An aerial tramway for Alaska.

A stamp mill for Oregon.

A stamp mill for Nevada.

A stamp mill for a London company operating in Southern Mexico.

Slag trucks, each of 60 cubic feet capacity, for copper smelter, Arizona.

Ore buckets and ore cars for California.

Special crushing mills, 54 inches diameter, 8 inches face, for Utah.

The present extent of the local industry and the unquestionable superiority of Denver-made machinery is merely an illustration of the doctrine of evolution. For nearly forty years intelligent, observant and ingenious men, who have made mining and ore treatment their life business in Colorado and the West, have been in personal contact with equally intelligent, observant and ingenious men engaged in designing and erecting ore treatment plants, or in manufacturing mining and ore treatment machinery, with the result that every improvement that a combination of scientific knowledge and practical experience could devise has been adopted, while each year has seen something discarded as inferior and a distinct advance made, until to-day the best mining machinery makers in Europe can come here and learn much in their own business.

That this is no idle boast is evidenced by the following: Eminent Colorado mining engineers engaged by the leading London syndicates to examine and report on mining properties in South Africa, Western Australia, and other parts of the world, are often struck by the "out-of-date" character of the European machinery found there as compared with that usual in Colorado.

A mechanical engineer from London recently told the writer that he had within the last few days inspected several of the newest mills in Colorado, and that the European mill builders and machinery makers, judged by their productions in South Africa, West Australia, etc., are very much behind the times, and that the latest Colorado productions are simply marvels of capacity and effectiveness, combined with economy of first cost and operation.

There have been various instances in British Columbia where mining machinery made in Canada or in Europe has been taken out and replaced by Denver-made machinery, as the latter is much lighter, more effective, contains all improvements up to date, and can be got at the same cost.

A private letter recently received from a gentleman in a mining district in Mexico says: "In this camp they have machinery that would make a horse leave its oats. The mills are imported from England. As to the Chilean mills, in some cases one wheel and a ring alone will weigh as much as an entire Denver-made Chilean mill. To operate five of these mills they use a shaft 9 inches in diameter. These mills run very slowly, and the wheel is set so near to the centre that they simply spin round and grind the ore instead of crushing it. Their capacity is very small, though they are expensive both to purchase and to operate. A Denver-made mill does more than twice the amount of work at one-third the cost, to say nothing of much less spent in repairs. The balance of the mining and ore treating machinery in Mexico is as far behind Denver-made machinery as are the Chilean mills. Most of it was bought in Europe, and you know what the English and German machinery is. I have been here now four months and I have never seen so poor a class of machinery as I have found here."

It is only a question of a comparatively short time when Denver-made machinery will largely replace the European-made machinery in Mexico, and Denver firms are reaching out for the business. One well-informed and experienced London gentleman who has just opened up a large gold mining property in Southern Mexico has within the last few weeks obtained all his machinery in Denver, as superior to anything he could obtain in England.

The explanation is that Colorado has probably a greater variety of ores than any other district of the same size in the world, and Colorado mining machinery makers have for many years past been grappling with and solving all imaginable ore treatment problems. One Denver firm has quite an elaborate ore testing department, and all machinery is designed and constructed by them with reference to the peculiarities of the ore.

British capitalists investing in American mines can safely accept as a fact the statement that the Denver manufacturers of mining machinery have had for years past exceptional opportunities of practical experience with mining and ore treatment problems, have taken the fullest advantage of those opportunities, and now supply much superior articles at competing prices. Competing European manufacturers can face the certainty that every year will see Denver and San Francisco manufacturers increasingly monopolize the mining and ore treatment machinery market of the entire American continent from Alaska to Cape Horn, with more frequent shipments to other parts of the world.—*The Mining Journal, Railway and Commercial Gazette* (London).

—The Brooks Locomotive Works has orders for 12 Moguls for the Kuishiu Railway of Japan, and is building one six-wheel side-tank engine for the San-uki Railway of Japan. The same company has orders for 20 elaborately finished locomotives for the Imperial Government Railway of Japan.





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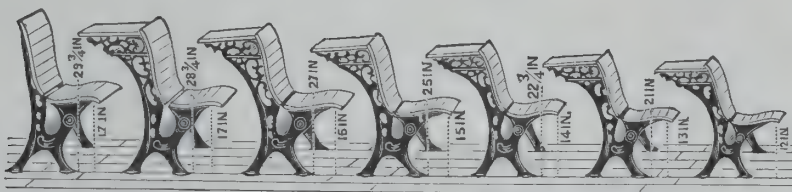
These Paints are acknowledged the best manufactured for their respective uses.

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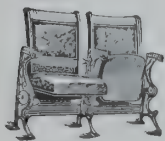
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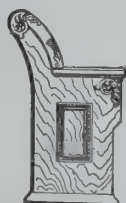
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Faithfully yours,

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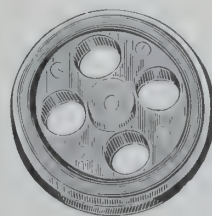
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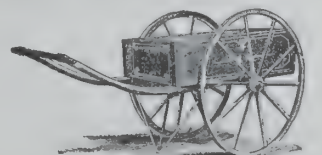
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### American Locomotives Abroad.

THE success of American locomotive manufacturers in securing foreign contracts, even against the competition of firms thousands of miles nearer the destined market, has recently called public attention both at home and abroad to this field of American manufacturing enterprise. This product of American shops is not a new thing, however. To Mexico and South America, to Cuba and Australia, the United States have been exporting locomotives in greater or less numbers for many years.

It is a dozen years since several American locomotives were sent to Australia for a State railroad because English engine builders would not undertake to build locomotives equal to the duty required of them and light enough to use the existing bridges. American builders furnished the engines, and they gave entire satisfaction. For railroads constructed regardless of expense for a heavy traffic the English locomotive may be equal to any, but American builders will hardly admit its superiority.

A Milwaukee paper recalls a test made not long ago in that city which, while not absolutely conclusive, none the less tended to confirm American builders in the opinion that their designs were the best adapted to meet such conditions as exist not only in this country but in most of the fields to which American locomotives go: "A huge and costly locomotive built in England was exhibited to admiring crowds at the World's Fair and afterward brought to Milwaukee to be used in experimental runs on the Chicago, Milwaukee and St. Paul road. Everybody remembers the result of the experiment. It was found that the locomotive did not perform satisfactory work. At first its failure was attributed to the inferiority of American coal, but finally the conclusion was reached that there were shortcomings in the machine itself. It was a beautiful piece of mechanism, but not equal to the best work in its class turned out at American works."

Three years ago, when Japan was making strenuous efforts to move large bodies of troops and quantities of supplies to the coast, English and American locomotives were subjected to some severe competitive tests, and on the whole the American machines gave the better results. How many locomotives Japan has bought of England we are not informed, but in two years following the war she bought 60 from this country.

The exports of locomotives for five years and the first quarter of the current fiscal year are as follows:

Year.	Number.	Value.
1893.....	195	\$1,794,709
1894.....	142	1,028,336
1895.....	252	2,379,549
1896.....	261	2,512,240
1897.....	338	3,225,831
Three months of 1898.....	80	582,979
Total.....	1,268	\$11,523,644

The foreign demand is now taking fully 10 per cent. of the maximum capacity of the American shops. In July, August and September, 1897, only 80 locomotives were exported, as against 116 in the corresponding quarter of 1896. But the exports for October numbered 48, valued at \$427,849, as against only 10 for October, 1896, valued at \$53,565. Moreover, many orders for locomotives have been received, those secured by two concerns within a few weeks of each other calling for 71 machines for five foreign countries. In another place, under "Locomotive Export News," we publish some of the most recent items of interest in this connection, although the showing made is necessarily far from complete, since some of the largest firms rarely publish news of their contracts until goods are ready for shipment.

The following figures show the distribution of American locomotives among our best customers for five years:

	1893.	1894.	1895.	1896.	1897.
Brazil.....	77	26	138	84	38
Chili.....	7	24	8	22	..
Cuba.....	56	33	36	4	3
Japan.....	..	16	23	23	95
Mexico.....	26	6	7	23	76
Russia.....	..	..	2	74	60

During 1897 Argentina took 13 American locomotives, China 12, Salvador 6, Guatemala and Hawaii 5 each. Three were sent to the United Kingdom.

It is not surprising that Cuba bought few locomotives after the war became general, but Brazil has been buying freely, Japan and Mexico are good customers, and Russia has been buying locomotives here since her heavy purchases in 1896, and she will probably continue to buy a good many, although she has bought one of our manufacturing plants and already has French and German locomotive building establishments.

For the cheap roads that countries of limited traffic must content themselves with the lightness of the American locomotive and its elastic frame, permitting all the drivers to take hold of the rails in spite of inequalities in the track, commend it over most other machines, and the exports of locomotives from the United States might have been very much greater many years ago but for the matter of expense. When iron and steel were considerably higher in this country than in England it was not easy for locomotive builders in this country to compete with those of England and the Continent. But now that there is little or no difference in the cost of the materials it is not a difficult matter for American builders to get contracts away from their European rivals, and there is a prospect of a great increase in the demand for our engines.

It is not necessary to go into the reasons for this successful showing on the part of American locomotive manufacturers at this time in any detail. A letter

from Mr. Angus Sinclair, the editor of *Locomotive Engineering*, recently published in the *London Times*, presents certain aspects of the matter so strikingly, however, that we give an abstract of some of his leading points.

There is, to begin with, no doubt about the facts. According to Mr. Sinclair there have been placed in the United States within six months about 200 orders for locomotives for foreign account. The actual number of locomotives is not specified, but even if an "order" means an order for a single locomotive, the statement means that at least \$6,000,000 worth of work has been awarded in six months, or a million a month, to American manufacturers, because they offered advantages over their competitors in quality or price, or both.

"American mechanical ingenuity" is the explanation that would suggest itself to most Americans. But that is too vague and general to carry us very far. Mr. Sinclair makes it more specific. He recalls that the first introduction of the system of making machines in interchangeable parts by separate workmen and assembling them afterward was made by Eli Whitney, the inventor of the cotton gin, which effected an industrial and social revolution second only to that effected by Watt. It was in the manufacture of firearms that this system was first introduced. Whitney for the first time made guns of which the parts were interchangeable. The enormous economy wrought by the subdivision of labor thus brought about was extended to clockmaking, to the making of sewing machines, and to other successful American products, so that these articles defied the competition of those made on the system that was superseded. Now, as everybody knows, "the interchangeable system of production" has been extended to all kinds of manufactures. But as it is more readily applicable to small than to large machines, it was a long time before it was extended to the building of locomotives. A locomotive continued to be an individual, so to speak, even after smaller engines had become assemblages of interchangeable parts. But the problem of applying the new system to locomotive building was at last solved, and to its solution is due the chief advantage the American builders enjoy.

Minor advantages followed the main advantage. It was found advantageous to pay workmen by the piece instead of the day, and it was found advantageous not only to make a much larger use than could have been made before of machine tools, but to throw these machine tools away as fast as they were superseded. Mr. Sinclair says that American locomotive builders are often heard to say that they cannot afford to use worn out tools, and adds: "From what I have seen of the shops of our competitors abroad, I think the prevailing policy is, 'We cannot afford to buy new tools.'"

It is not to be wondered at that these differences of policy should give the American builders an irresistible advantage. Mr. Sinclair cites the fact that a Scotch firm employing 2,500 men turned out in a year 200 locomotives, while an American firm employing 1,400 men turned out in the same time 300 locomotives, of a much higher average of weight and power. Mr. Sinclair also points to the difference in the efficiency of the human labor. Touching the threat of the English mechanics to follow their trade if it is driven from Great Britain, he says that "should they follow it to America they will have greatly to change their ways in order to secure employment." They will have to work both longer and harder, and will discover why, "while paid the highest wages in the world, the labor of the American mechanic is cheaper than any other."

A recently published interview with the managers of the Brooks Locomotive Works presents the matter clearly and succinctly from the point of view of the American manufacturer:

"The large increase in railway mileage in Russia, China, Japan, India, Australia, South America, etc., will, if we understand the conditions correctly, compel those countries to look to the United States for a large portion of their motive power, for the reason that the European manufacturers, on account of their small concerns, their methods of manufacture, etc., would be unable to fully supply this demand, and the superior methods of the American manufacturer enabling him to build larger locomotives in a given time, also enables him to compete successfully with those concerns that formerly supplied all of this demand. Some of the disadvantages the American builder labors under are the prejudices of the foreign capitalists interested in railway construction and extensions referred to, as he almost invariably gives preference to the manufacturers of his own country. This is notably true of the English and German capitalists.

"These disadvantages, however, must very largely disappear as the superiority of the American locomotive becomes known, as well as the ability of the American builder to underbid the European. The early orders coming to this country were for distinctively English and continental types of locomotives. These have become gradually Americanized until now the tendency among all railway companies or governments ordering their locomotives in the United States is to take the American type in preference to the English or continental."

### Alabama Iron for Japan.

FIVE thousand tons of Alabama iron have left the Port of Pensacola for Kobe and Yokohama, Japan, recently. The shipments are the outcome of a number of trial orders that have come from the Japanese Empire the past few years. The Alabama operators have established connections with brokers in the Far East, and made arrangements for a regular trade. The recent shipments were made by the Tennessee Coal, Iron and Railroad Company and the Sloss Iron and Steel Company. The orders were secured after Alabama iron had been found satisfactory, and when it was known that it costs \$4 less a ton at the furnaces than English iron, with freight charges practically the same from American ports as from England.



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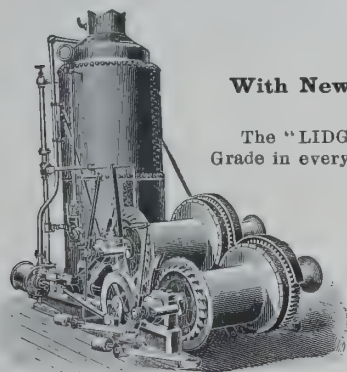
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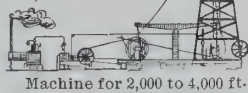
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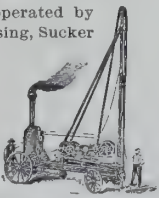
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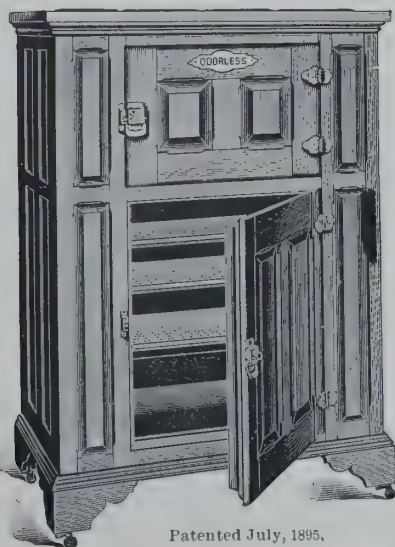
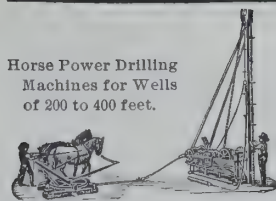


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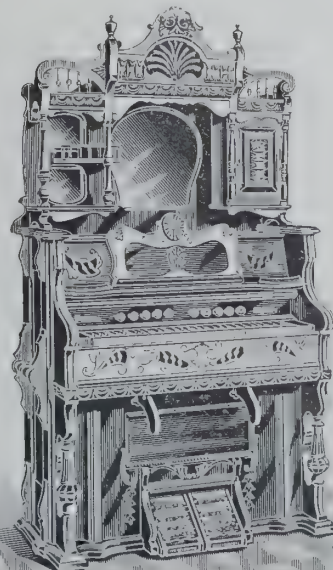
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### Steel Tracks for Country Roads.

A VERY interesting series of experiments have been going on for a year or two past in different parts of the United States with a view to equipping country roads with steel tracks for heavy hauling. The problem of how to secure the best and cheapest country road is as old as the Romans, and never was of greater commercial importance than now. We give herewith the inventor's description of these roads:

"The road was first graded in proper shape. The rails are of steel,  $\frac{1}{4}$  of an inch thick, 8 inches wide, with a downward flange of 3 inches on either side, and an upward flange of 1 inch on the outer edge to keep the wheels on. These rails were laid on the crown of the grade and pressed into the soil to the depth of the flange or until the soil supported the rail. The downward flanges prevent the soil from being pressed away from the rail and hold it there, making a firm foundation, so that no ties are necessary on which to rest the rails. These rails are made continuous by the fastening of the ends together with fishplates. The earth between the rails is removed to a depth of 5 inches and the excavation filled with gravel for the horses' tread. There is little occasion for a horse to tread on the rails, as there is room enough between them. This road has now been in use for eighteen months and has been tested with all kinds of traffic, including traction engines.

"A mile of road requires about 60 tons of steel, which can be produced in quantities for \$1,800 or less. One cubic yard of gravel is required to the rod. The claims made by the inventor for this road are:

"First.—It saves power. A vehicle may run on it with the least possible draught. It is estimated by engineers that the required draught is one-fifth of that on gravel and one-twentieth of that on the average dirt road.

"Second.—It saves wear and tear on wagons. A vehicle is always on a level, smooth surface and is not subject to irregular strains, as when one side of it is much lower than the other, causing two wheels to carry most of the load, when a wheel drops into a rut. A town will save enough in vehicles alone to pay a large portion of the cost of the road.

"Third.—It saves time. With a load of 2 or 3 tons a team will trot as easily on level ground as it will walk on a gravel or dirt road.

"Fourth.—It is a perfect bicycle road and will be greatly appreciated by wheelmen.

"Fifth.—It is extremely durable and repairs will be nominal.

"Sixth.—The dust which is so annoying on a gravel or dirt road is caused largely by the grinding of the wheels. On this road there could be no such grinding.

"Seventh.—It is a motorcycle road and a speed of 20 miles per hour can be obtained with safety.

"In conclusion.—The universal use of this road will increase the value of the farm; it will beautify the street because when we cease to rut the road grass will take the place of weeds. It will make possible the free delivery of mail in the rural districts by bicycle or other swift vehicle. Travelling will be as safe at night as in the day, because the team will keep the road."

The tests made by another engineer give an even greater saving of draught power than that claimed above. His tests demonstrate that the steel roads for traction require one-twelfth the power as compared with macadam, and one-twenty-seventh the power as compared with earth roads.

Congress is to be petitioned at the coming session for the necessary sum to equip a number of roads in different parts of the country with the steel rails, and the plan will be tested on a wholesale scale before any decided action is taken to make the system general throughout the country.

The steadily decreasing price of steel—60 tons of steel even if drawn in the unusual form called for by such rails would probably cost much less than \$1,800 to-day—and the constantly increasing demand for roadways of low resistance for heavy teaming may make steel roads practicable for short distances where the traffic is very great.

### Demand for Machinery in Mexico.

A RECENT number of *La Revue du Commerce Extérieur* of Paris contains the following paragraph: "The development of the mines in Mexico has occasioned a demand for all sorts of machinery and materials. There is also an opening for milling machines, and those employed in the manufacture of sugar, in distillation and brewing, in dyeing, spinning and weaving. Fire engines, motors, machinery for constructing canals, railroads, and ports, appear to meet with success. A central agency for these articles, with men having the necessary technical and commercial knowledge, would certainly, in time, be a remunerative enterprise. The *Leipziger Tageblatt* says that the travelling agents of commercial houses should know Spanish, should have a certain amount of experience and tact, and should be able to adapt themselves to the social customs of the country."

There are not many American houses doing business abroad that have not been familiar with these facts for a long time. It is interesting to note, however, that the French are beginning to study the conditions of trade in the markets of Mexico. But that the French manufacturers will find themselves able to build, and lay down in Mexico, a single machine in the various classes mentioned in the paragraph at prices that will enable them to compete with the American houses already having long-established relations there may well be doubted.

### Locomotive Export News.

—The Richmond (Va.), Locomotive and Machine Works received a contract recently from the Canadian Pacific Railway for 15 compound engines.

—Within a short time the Baldwin Locomotive Works will ship 20 locomotives to Brazil. Passenger cars also are to be shipped soon from Philadelphia to the Argentine Republic.

—The Philadelphia Bridge Works, of Pottstown, Pa., has received an order for two locomotive turntables for Corea. Each machine will be 40 feet long, and will be adapted to 40-ton locomotives.

—The report that a party of Russian engineers are now on the way to this country to place orders for a large number of locomotives for the Trans-Siberian Railway has been confirmed. The merchant having received the advices does not think it proper to make any statement prior to their arrival, which will be in about six weeks.

—The Rogers Locomotive Works, of Paterson, N. J., has received an order for 15 new locomotives from the Government of Japan. The locomotives ordered are of the Mogul type and are to be used for heavy trains. Work on them will begin at once. The same company has completed and is about to ship eight locomotives and tenders to China for the Imperial Government Railroads, Lu Han Line.

—H. K. Porter & Co., builders of light locomotives, Pittsburg, Pa., have on their erecting floor, ready to ship, a 24 inch gauge plantation locomotive for Mexico, a standard gauge double ender passenger locomotive for Central America, and a 30-inch gauge plantation locomotive for the West Indies. During the year 1897 H. K. Porter & Co. have sent locomotives to Porto Rico, Alaska, Hayti, Finland, Guatemala, Mexico, Venezuela and Canada.

### Locomotives for China.

IN our last number we noted the arrival at Tangku, China, of twelve Baldwin locomotives intended for the Tien-Tsin-Lukonchiao (Pekin) Railroad extension. Consul Read of Tien-Tsin has this to say of railway matters within his jurisdiction:

"A representative of the firm of Messrs. Burnham, Williams & Co., of Philadelphia, the makers of these locomotives, is now in Tien-Tsin to superintend their erection.

"Eight of the locomotives are very heavy and are of the "Mogul" type, and the order for them was secured by Messrs. Burnham, Williams & Co. last September, this firm having tendered them at prices far below those submitted by English firms. The other four are switch engines, and were ordered outright without a call for tenders.

"It is a matter of great satisfaction that the new line is equipped with American locomotives. We can rest assured that Messrs. Burnham, Williams & Co. have laid down locomotives that will be in every respect according to specifications, and that will more than meet the expectations of the railway officials.

"I trust that we may, with regard to future extensions of the railway, hold the vantage ground that is now ours.

"The next order for locomotives will be for the Lukouchiao-Paotingfu extension. This extension will be rapidly pushed as soon as the line to Peking has been double tracked."

### The Day Before New Year's in New York Exchanges.

PREPARATIONS for a riot of fun were carried out with signal success by the brokers at the Consolidated Stock and Petroleum Exchange the afternoon of December 31st. When the Eighth Regiment band was piloted through the boisterous crowd on the floor of the Exchange business was suspended with a whoop and a hurrah. The band played a lively two-step, and the fun began with a dance by a gray haired man, a hornpipe by a young broker, and a jig by two lucky messengers, who were showered with small silver for their pains. The dancing, wrestling and cheering grew faster and louder with every minute until sheer exhaustion put a stop to it.

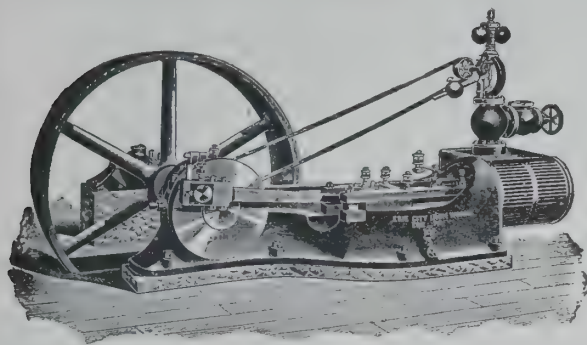
At the Coffee Exchange there was no little merriment. A member sang "La Marseillaise" in response to a numerously signed petition. The following greeting was received: "The Hamburg Exchange wishes you a happy and prosperous new year." An appropriate response was sent.—*The Sun*.

### Copper Produced and Consumed in the United States.

DURING the first seven months of the past year there was mined in the United States 108,000 tons of copper, this being an increase of 16,000 over that mined during the corresponding period in 1896. This increase was caused by the enlarged demand for both export and home consumption. The amount exported was 78,000 tons, an increase of 9,000 over the previous year, leaving an increase of 7,000 in this country. As there was apparently very little augmentation in stocks on hand, this 7,000 represents very closely the increase in consumption. The present and prospective activity in manufacturing will undoubtedly cause still further increase in the future.

IN the past two years and a half there have been some remarkable cost reductions in American tin-plate manufacture, amounting to probably over \$10 a ton on an average, says *Tin and Terne*. The changes that have taken place have been in management, methods and machinery, and scarcely a department in the tin-plate works has escaped more or less radical changes.





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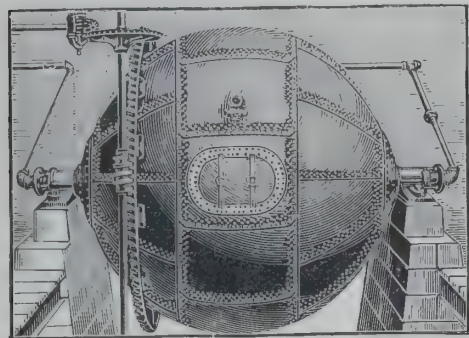
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CAPACITY OF WORKS :  
300 Boilers per month.  
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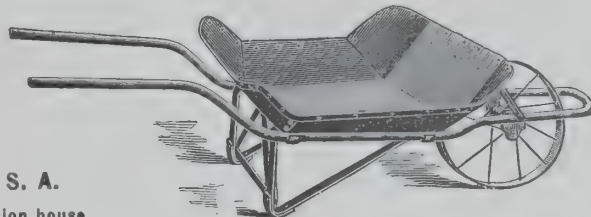
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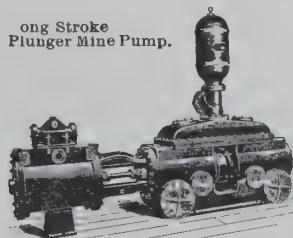
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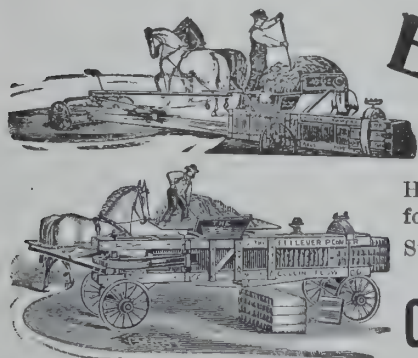
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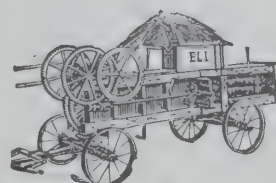


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Also manufacture Harrows, Cultivators and 140  
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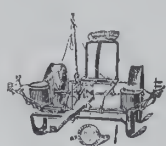
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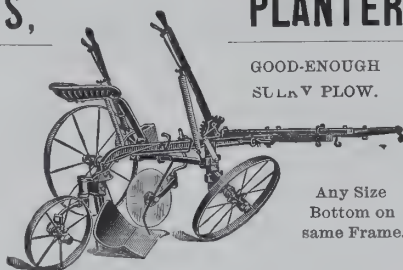
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All kinds, all sizes.

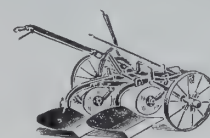


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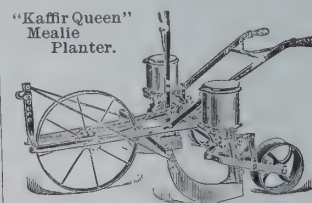


GOOD-ENOUGH  
SULKY PLOW.

Any Size  
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Flying Dutchman  
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"Kaffir Queen"  
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F. O. B. New York. Special Attention paid to the Requirements of Foreign Countries.

Foreign Agencies: JOHN & JOSEPH DRYSDALE, Buenos Aires, South America.  
Mess. MALCOMESS & CO., East London, Cape of Good Hope, Africa, for South Africa.

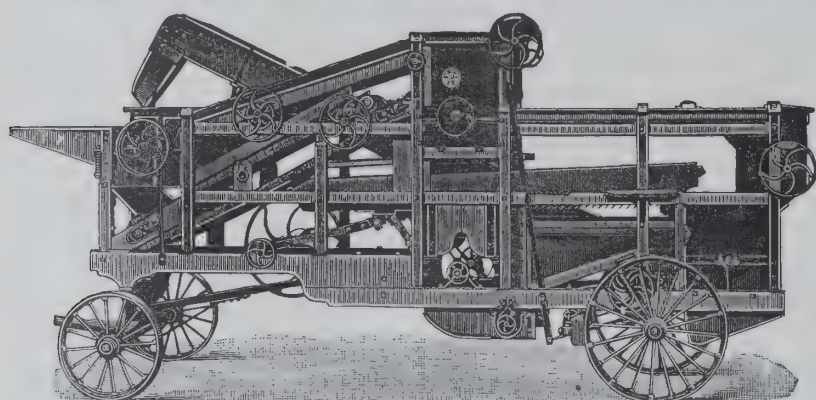
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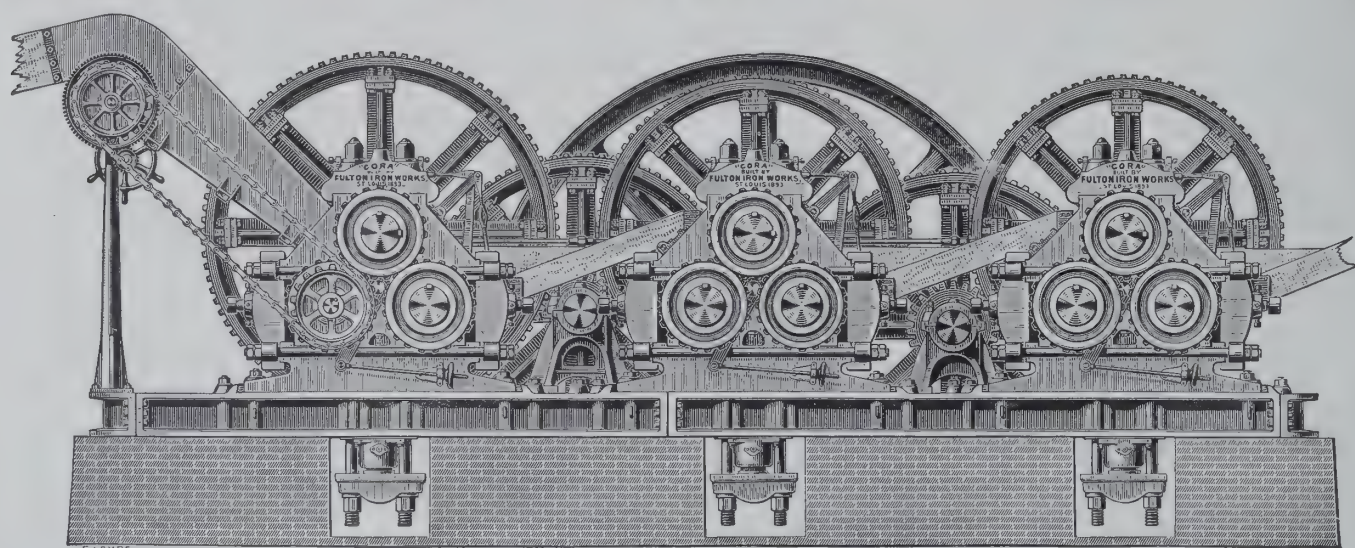
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CORRESPONDENCE SOLICITED.



ESTIMATES FURNISHED.

Built by "FULTON IRON WORKS," St. Louis, Mo., U. S. A.

Per S.S. "COPTIC."

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary





Devoted to the Foreign Trade in Agricultural Machinery and Implements.

## The Russian Market for Farming Machinery and Tools Again.

IN our last number we published an extended account of the growing market in Russia for agricultural implements and machinery. The following, from the *Millers' Gazette*, London, gives a somewhat more detailed account of one important feature of the situation, namely, the recent action of the Russian Government placing such articles on the free list, or greatly reducing the duty thereon:

"Recently a committee was appointed by the Minister of Finance to examine the duties on imported agricultural implements and machinery. The landed proprietors desire the reduction or total abolition of these duties, but the greatest opposition to this was naturally displayed by Russian manufacturers. The committee examined a great number of witnesses, and at the final sitting the chairman stated that the committee would recommend the entire abolition of the duties of some machines and implements, a reduction on others and the free importation into Russia during the next five years of certain machines not made in the country, such as sheaf binders, steam plows without engines, compound threshing machines, hay scatterers, sorters with spiral cylinders, potato sorters, cream separators, brickmaking machines, manure spreaders, horse rakes, etc., and further, that agricultural machines and implements newly invented and in use abroad be also allowed to be imported free of duty into Russia during the next five years."

Although Russia is by no means a new country, the conditions there are practically the same as those that confronted the pioneers who developed the great farming regions beyond the Mississippi. The now world famous agricultural machinery produced in the great manufactories of Chicago and the other American agricultural machinery centres are the direct results of the experience of farmers and manufacturers working together to solve the problems there presented. Every machine represents years of improvements suggested by the widest practical experience and worked out by the most expert intelligence. These machines are calculated to produce the largest possible results with the least possible expenditure of labor. Formerly their initial cost was high, owing to cost of iron and steel and many similar disadvantages. Now, however, these machines are produced at a cost that enables the manufacturers to pay liberal royalties to the inventors and still compete with the cheap imitations of other countries.

If both the farmers and merchants of Russia realize that the cheapest machinery is that which is the cheapest in the end, that does the most work, wears the longest, does its work with the greatest thoroughness, we have little fear that American manufacturers will fail to get their share of the increased trade in agricultural machinery sure to result from the farsighted action of the Russian Government.

### Grain Exports for 1897.

THE year just closed was marked by a notable shortage in the world's grain supply, all of the great producing countries except the United States experiencing a serious failure of crops, which, while not so great as to prevent them from exporting altogether, curtailed none the less their ability to supply other markets than their own. Added to this was the fact that for two years past crops had been considerably below the average all over the world, the United States included, while the demand was certainly normal. The inevitable result was that the stocks of the world were at an uncommonly low point by the Spring of 1897.

The *Liverpool Corn Trade News* estimates the world's wheat crop for 1897 and preceding years, in bushels, as follows:

	1897.	1896.	1895.
Europe .....	1,118,800,000	1,483,960,000	1,442,150,000
America .....	682,000,000	554,000,000	611,000,000
Asia .....	289,000,000	280,000,000	339,000,000
Africa .....	32,000,000	32,000,000	41,700,000
Australasia .....	37,000,000	24,950,000	25,111,000
Totals .....	2,158,800,000	2,374,910,000	2,458,961,000

This table shows the shortage from 1896 to be some 216,000,000 bushels, and from 1895 over 300,000,000. The statistics of the United States Department of Agriculture make the falling off still larger, but underestimate the crop of the United States (preliminary estimate). To express the significance of the

statistics in words, America yielded a surplus over 1896 of some 128,000,000 bushels, and over 1895 of 7,100,000, but vastly offsetting this was a shortage on the part of the rest of the world of 344,000,000 bushels from 1896 and 372,000,000 from 1895.

Under the circumstances it was only reasonable that European importers were decidedly anxious to provide for immediate and nearby requirements, especially as they realized that they were mainly dependent upon this country for their supplies, there being practically no wheat available elsewhere except, possibly, in Russia.

Some idea of the magnitude of the export movement may be formed from Bradstreet's table of clearances of wheat (and flour as wheat) from all domestic ports and Montreal for the current calendar year (two weeks estimated), compared with like shipments in 1896 and 1895. The approximate total amounts to about 185,000,000 bushels, compared with 151,000,000 bushels in 1896 and a total in excess of 130,000,000 bushels in 1895.

The record year for wheat and flour exports was 1891-92, when we shipped 225,000,000 bushels, due largely to the great shortage in the Russian crop.

A point of great importance to American farmers was the fact that these conditions were foreseen and they were warned by the press so far in advance that the great subsequent rise in the price of wheat has been for their benefit rather than that of the speculators. The announcement that wheat had touched the dollar mark was the signal for rejoicing in many Western stock exchanges and boards of trade, for "dollar wheat" means prosperous times whenever it is the farmer who reaps the advantage, as has been the case the past year.

The shortage in the world's wheat crop has naturally helped corn and other coarse grains. Indeed, the unfavorable climatic conditions in Europe also served to diminish the yield of rye and feeding stuffs, but especially oats; hence, there has been a heavy export business in corn and oats and a fair movement of rye at firmer prices. It is alleged that the enhanced cost of wheat bread resulted in an increased consumption of rye bread, corn products and oat-meals, not only in Europe; but in this country. While wheat was rising over thirty-six points, corn gained only about nine cents. Part of this advance was owing to the less favorable prospect for the growing crop, consequent upon the cold, wet weather West during the time when hot, forcing weather was most needed. The yield was cut down in consequence probably 300,000,000 to 400,000,000 bushels compared with the record-breaking crops of 1895 and 1896.

The Agricultural Department has made no final report as to last season's yield, and in the following table we give the average commercial estimate:

	Corn Crop. Bushels.
1897 .....	1,800,000,000
1896 .....	2,283,875,000
1895 .....	2,151,138,500

The increase in exports of Indian corn from both coasts of the United States this year, as compared with last, has been very heavy, and as contrasted with 1895 the outward movement is almost trebled. Bradstreet's reports of last year's foreign shipments (two weeks estimated) indicate an approximate total of 179,000,000 bushels, compared with 118,000,000 bushels in 1896 and with 57,000,000 bushels in 1895.

It is believed that, while part of this demand is due to the temporary conditions above noted, the demand for American corn (maize) abroad will continue strong, since now many people have become accustomed to its use. A natural prejudice existed against it at first, people having regarded it as food for cattle rather than for men, but now that necessity has compelled a trial, it is thought that its cheapness as compared to wheat will insure its continued use in considerable amounts.

The exports in oats for 1897 were, for the six months from July to December, 37,807,000 bushels, as against 19,691,000 for the corresponding months of 1896. Of rye the exports for the same months of 1897 were 6,546,000 bushels, against 4,442,000 for 1896.

### Cotton Exports to Japan.

THE exportation of raw cotton from the Southern States to Japan by way of Pacific Coast ports is practically double what it was in 1896. According to the figures of the Southern Pacific Company, there are at present in San Francisco 15,000 bales of cotton awaiting shipment to Japan. There are not steamers enough in the Pacific mail service to prevent a congestion of this and other westbound Oriental freight.

The exports for November were more than 100 per cent. in excess of those for November, 1896, being over 7,639,000 pounds, against 3,264,000 in round numbers from the corresponding period of 1896. For the three months ending with November, 1896, the exports of raw cotton from this country to Japan were 4,864,834 pounds, and for the corresponding time last year 12,843,621 pounds.

It is pointed out that the demand for our cotton there must increase because of its longer staple, which makes it more suitable for yarn manufacture than the Indian fibre. Another thing that favors a still further increase in our export cotton trade with Japan is the fact that China, hoping to become a successful rival of Japan as a cotton manufacturer, has erected mills which will consume the greater part of the cotton grown in China for several years to come. Japan formerly raised considerable cotton, but it has been found that it costs more to grow the raw material than to import it. In 1896 the home product was less than 1 per cent. of the imports.

That the Japanese recognize that they shall need the American market more and more is evident from the fact that the leading importers have made contracts with the transportation companies for a fixed scale of transportation rates for a term of years, as described elsewhere in this paper, and that these contracts specify a considerable minimum volume of shipments.



### Exports of American Flour to Japan.

ALMOST every line of commerce between the United States and Japan has enjoyed such a remarkable development that it almost seems to go without saying that the exports of any given commodity to that progressive country show an increase for 1897 as compared with the preceding years. In one line, however, the increase, while not greater than that shown in the trade in several other articles, is exceptionally interesting and gives the most hopeful promise for the future.

This is wheat flour. The Japanese are not consumers of bread, but use flour in the manufacture of confections, of which great quantities are sold and used not only as accessories, as with most nations, but as staple articles of diet. If anything, this fact tends rather to intensify the Japanese demand for flours of a superior quality rather than the reverse. Consequently it is particularly gratifying to note such friendly comments as the following from the *Japan Weekly Advertiser*, published in Tokio. The quotation from the *Jiji*, which is practically the official organ of the Mikado's empire, is especially noteworthy:

"Shipments of flour from America are yearly increasing, and it promises to become a leading import in the near future. This, says the *Jiji*, may be attributed to the superiority of its quality to that of native flour, and any one who has once tasted it will never think of buying any other, so that it will probably be in general demand like imported kerosene oil."

The following table, based upon the consular reports for December, bears out the preceding in a most striking manner. The imports of flour from other countries during these years were insignificant, ranging from \$2,000 to \$6,000 in value taken all together. The imports of wheat flour into Japan from the United States from 1890 to 1897:

Year.	Quantity.	Value.
1890.....Lbs.	8,888,032	\$179,148
1891....."	11,952,270	270,655
1892....."	10,025,250	191,902
1893....."	11,862,682	199,067
1894....."	19,753,041	302,049
1895....."	13,866,971	205,422
1896....."	31,408,313	519,508
1897....."	.....	.....

The first annual returns (1896) from Formosa, now a part of the Japanese Empire, show that the imports of wheat flour from the United States were, in quantity, 6,900,330 pounds, and in value \$116,016.

A portion of the great increase in 1896 may probably be ascribed to the war with China and be put down as temporary, but on the other hand the discovery that a steady rice diet encourages the tendency to the disease known as "kakke" or "beri-beri," and the requirement on the part of the authorities that wheat flour be used occasionally in the army and navy, must give rise to a permanently increased demand. That this is the opinion of the great Japanese importing houses is shown by the fact that they are now crowding the foreign commission merchants out of this field, and it is understood that arrangements will be made with the steamship companies looking to the establishment of definite routes and freight rates fixed for a term of years.

### A New Mowing-Machine Knife Grinder.

THE owners of improved machinery are becoming more and more alive to the necessity of the utmost care while such machinery is in use. A dull mowing machine means not only a waste of energy on the part of the horses drawing it, but an increased loss from wear and strain on the part of the machine, and an important loss also through stock being badly cut and much of it left on the field. Dull mower sickles are, however, often allowed to go because the grinding of them by ordinary means is so troublesome. It requires not a little skill to properly grind a mower sickle on a grindstone, and many sickles are thus ruined by an unskilled operator. The Empire mowing-machine knife grinder is designed to enable any farmer to not only grind the sickle with great rapidity, but with a mathematical accuracy that will insure a good edge with the least waste of metal and preserving the original bevel as long as the sickle holds out. The device is adapted to be carried with the machine, being small, compact and light. It can be clamped to the master wheel in a moment, the sickle bar disengaged and placed in the tilting bracket in such position as to present first one bevel then its reverse to the grinding face of the emery wheel, which is driven by multiplied speed gear actuated by a cranked drive gear wheel. The mechanical arrangement is such that the grinding face contact skims along the bevel from heel to point, making a complete, clean job. With this device badly misshapen sections can be quickly restored to good shape and accurately preserved in such condition without trouble.

### French Duty on Pork Products.

THE French Chamber of Deputies having passed the bill increasing the customs duty on hogs and hog products by a vote of 418 to 97, little hope is now entertained that France will grant the concessions upon which a reciprocity agreement with that country depends. The advance in rates was sustained by a statement that in three years the imports of hog products into France exceeded the exports by 95,000,000 francs, and that prices had suffered in consequence.

This argument, from the farmers' and dealers' point of view, perhaps, is

conclusive, but pork is already one of the most expensive of French meats, and if foreign pork is shut out prices will rise still higher, as no material advance in the number of hogs raised can take place. That so large an excess of imports over exports exists clearly indicates that the French eat more pork than they can raise, and to whatever extent the farmers or packers may make a profit by reason of this further restriction on the American meat trade, it will inevitably be taken from the pockets of the consumers—the people who are entitled to the benefits that would accrue from a reduction instead of increase on the duties in existence previous to the bill's passage.

The people are not more benefited by the change in duties than would be a man who exchanged his silver for equivalent value in gold, but, on the other hand, are forced to lose not only the benefit of reasonable prices for pork and pork products, but the benefits of a reciprocity agreement favorable to the exportation of French manufactured goods into this country. It should be understood that there is but a limited field for our manufactured products in France, which should afford an excellent market for our breadstuffs and provisions, while, on the other hand, the United States is one of the best markets in the world for the manufactured goods and wines of France.—*The National Provisioner*.

### Plows Wanted in Greece.

THE Greek Government wants to buy at least 10,000 plows, to distribute among the Thessalian refugees in order that they may return to cultivate the land they abandoned at the approach of the Turks. Thessaly is mostly a plain, with sticky, clayey soil, in which wild plants and roots abound. The Thessalians are just now a burden on Greece, and King George has a committee at work testing implements for them on a farm near Athens. Native plows are good, but expensive. Wood is scarce and costly, so Greek plows are made wholly of iron and steel, on which there is a high duty. Agricultural implements are, however, admitted free.

George Horton, the American Consul at Athens, reported recently that a firm in Smyrna sent over some American Oliver plows, which were better than any Germany, England or France offered, but the agents wanted high prices for them, though they were not best grade. Consul Horton told the committee that Americans make better, stronger, lighter and, quality considered, cheaper agricultural appliances than any other country in the world. This interested the committee, and Consul Horton feels encouraged as to the outlook for American manufacturers if they but bestir themselves. If the conditions presented in Thessaly are peculiar and call for a special type of plow to insure the best results the Greek committee will do well to see what American manufacturers can do in the way of devising or adapting implements especially suited to meet those conditions.

### Cornstalks in Commerce.

A FIRM with a large capital, and in which several prominent manufacturers are interested, is about to start a factory in which various products will be made out of cornstalks.

It has been found by experiments that from cornstalks rubber can be duplicated, and other products are armor for battle ships, vegetable ivory, oil feeders, patent-leather coating, liquid to make canvas waterproof and paper.

Heretofore farmers have left their cornstalks lying on the field for fertilizer or fed them to cattle, and in seasons when the price of corn has been low it has often been a question with the farmer if it paid to produce his crop when freight and other charges had been deducted. If it should prove true, as claimed, that these new uses for cornstalks will mean \$10,000,000 annually for the farmers engaged in corn-raising the importance of this new industry can hardly be estimated.

Not only will it create a margin of profit likely to encourage the cultivation of this valuable food product, but it will, in all probability, reduce its price, thus benefiting the masses, not alone in this country, but abroad. It is understood that the United States Government is planning a great exhibition at Paris in 1900 to demonstrate to Europeans the value of corn, or maize, as our English cousins call it, as a food for the working classes. Such missionary work as this, together with the discovery of uses for the stalks such as are suggested above, may make the raising of corn on a large scale, and with the help of improved machinery, a far greater branch of agriculture than it is at present, both at home and abroad.

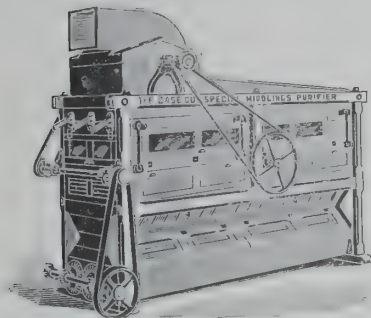
### A Powerful and Cheap Portable Coal-Oil Arc Lamp.

A RECENT invention likely to be of great value to manufacturers who have occasion to carry on nightwork in places not readily lighted by electricity, gas, or ordinary kerosene lamps, or for contractors and others having outdoor nightwork to do, is that of a portable device for generating a strong white light from crude or refined petroleum. It is greatly superior to the kerosene torches widely used and is claimed to have double the lighting power of an ordinary electric arc light. It possesses the advantage of being complete in itself, simple, effective, economical and not affected by storms or winds. It is also claimed that this lamp gives better results than electricity, as it does not cast heavy shadows and in more penetrating through smoke, fog or steam. It is made in four sizes, No. 1 giving a flame of about 500 candle power; No. 2 about 1,000 candle power; No. 3, 1,500 to 2,000 candle power; No. 4, about 4,000 candle power. It is especially adapted for use in iron foundries, boiler works, mines, contractors' work on docks, for night agricultural work, and, in fact, wherever a strong, readily portable light is required.

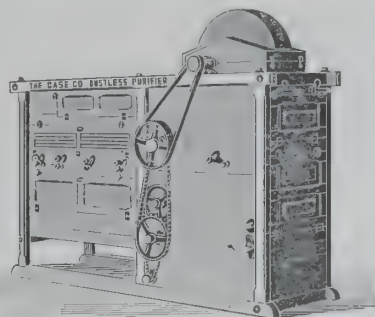


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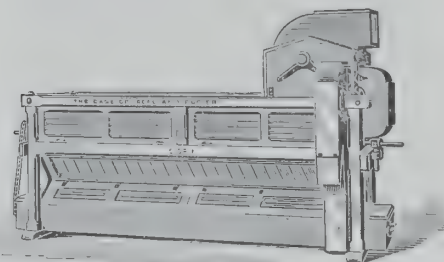
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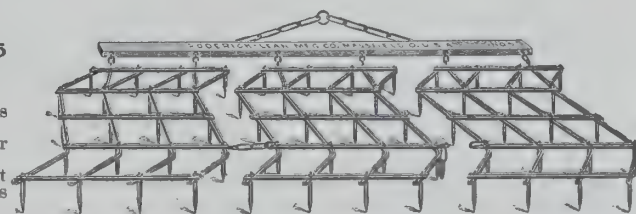
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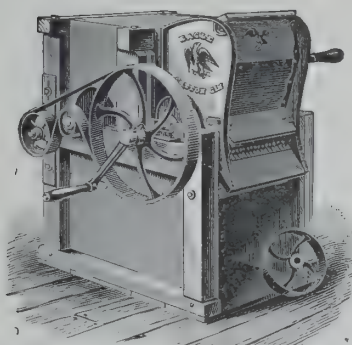
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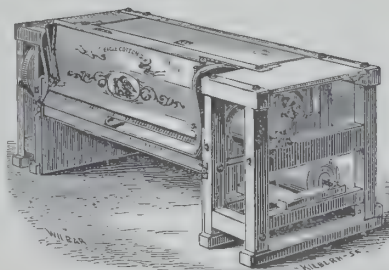
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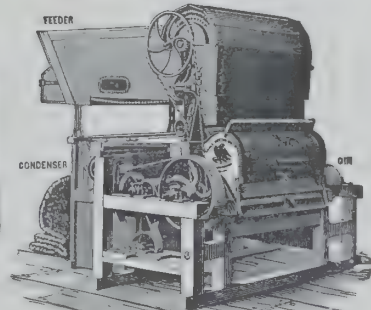


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### Advance in Electricity in 1897.

AS has become its annual custom, the *Electrical World*, in its issue for the first week of January, presents a review of American electrical progress for the preceding year. The summary is so comprehensive and interesting that we reproduce some of the more notable paragraphs for our readers:

"The twelve months just passed have been distinguished by no very startling or radical innovations or discoveries in the electrical field, but rather marked by a steady advance along all lines. Applications of electrical power and the general utilization of this agency have multiplied, and a gratifying enlargement of the capital invested, both in manufacturing electrical apparatus and in the generation of current, may be noted.

"In practical engineering there have been several marked features of advance. The long distance transmission of water power has been the field for many interesting developments, and the colossal installations erected during the year have exhibited the highest class of engineering skill and not infrequently of capitalistic daring. The increasing use of multiphase currents and the continual improvement in machinery for their generation and utilization have shown the direction of the evolution of central station and power transmission engineering, while their application to railway work is strongly foreshadowed.

"In electric traction increasing attention has been given to the equipment of heavy railways, principally for suburban traffic and of those working under exceptional conditions, such as elevated roads. The experiments of the New York, New Haven and Hartford Railway Company near Hartford have been an encouragement to the railway companies, while the equipment of roads intermediate in class between the ordinary city trolley line and the heavy railroad has progressed continuously. The adoption of an open conduit system by the street railways of New York City and the success which has attended their opening for traffic are important factors of the year's advance in electric traction.

"The electric automobile has taken its place as a commercial and practical machine, and electric cabs and vehicles no longer attract attention in the streets of New York.

"In electric lighting the principal advances have been in the increasing use of high voltage lamps and the substitution of rotary transformer substation systems for the multistation low pressure installations which have for many years illuminated our principal cities. In many new installations lamps for 220 volts or even higher pressures have come into use, while numerous installations have changed over from the old standard pressure of 110 volts to the new.

"The inclosed arc lamp has increased its application prodigiously, and bids fair to displace the open arc form in many places. It has of late been used, burning on constant-potential circuits, for street lighting, with excellent results, and it is confidently expected that the alternating current types of such lamps, which have been perfected during the year, will soon be as widely used as those for direct current.

"In telephony the advance has been confined to details of exchange system rather than to radical improvements of apparatus. The independent companies have grown in strength, and their association formed during the past Summer promises to play an important part in telephone affairs in the future.

"The electrical elevator has taken its place as the standard machine, having been almost universally installed in new buildings, and in many cases taking the place of hydraulic elevators.

"In other applications the great adaptability of the electric motor has been prominently shown. It is coming to be used more and more for the direct driving of many kinds of machinery, notably printing presses and machine tools; and the manifold advantages of electric power transmission over the time honored method of belts and shafting have become so well understood that few large new factory installations are considered complete without an electrical system of machine driving.

"Looking at the future of the electric railway it is seen that all indications point to the suppression of the steam locomotive for suburban and interurban work in favor of the electric train. Already several railways having large suburban systems are making experiments and preparing for the inevitable change in motive power.

"Perhaps the most popular demonstrations during the year have been those made by the advocates of wireless telegraphy, largely owing to the prominence given to the well-known Hertz waves by Mr. Marconi. This seems to have, in a measure, captivated public fancy, but so far no very practical results have been attained, nor has the advance been commensurate with the interest it has elicited.

"The steam turbine as a possible and probable factor in the development of the electric arts deserves notice as the most promising method of developing the motive power of steam at present known.

"It may be said, in conclusion, that the progress of the electric arts in

America during 1897 has been very gratifying. Electrical engineering has advanced beyond the stage when revolutionary departures are the rule, and has reached the level of successful adaptation to the demands of necessity. Its growth and extension, therefore, must now be marked rather by the steady betterment of its means and methods, the gradual enlargement of its field of labor, the deeper identification with the advance of civilization, than by brilliant and revolutionary change. Here, at the beginning of a new year, it is pleasant to look back and see that in no single department of the vast field of the electric arts has there been any retrogression, but in all that sure and steady improvement that is the sign of maturity and full development."

### Electric Haulage Along Canals.

IT is strange to realize that in the history of canal construction, which dates back to the days of Rameses in Egypt, little or nothing has been done to improve the ancient and honorable method of dragging canal boats through the water.

Canals form so important a part of any country's commercial equipment and add so much to the facilities by which freight is transported that no doubt whatever should exist as to the great advantage derived from the use of a practical and efficient system of towing boats along a canal.

The recent advance in electrical knowledge and the numerous successful methods of application of electric power have led to a number of interesting experiments looking toward the replacement of the ancient mule that has done service on towpaths for centuries by some form of electric power. Two systems have thus far been proposed—one placing the driving power upon the boat itself, the other placing it upon the bank. In the former case wires are suspended above the canal to supply the current. The boat is equipped with a trolley similar to that on an ordinary trolley car and a small screw propeller is driven by the current thus supplied. This system has the merit of simplicity, but two serious objections are urged against its general adoption. One is that most canals are not adapted to the passage of self propelling boats of any kind, the strain being likely to be too great for the banks. The other is that this method would not only involve the erection of a considerable plant along the banks of the canal, but every individual boat would have to be equipped with motor and propeller before the overhead power could be available. Since in every country these boats are the property, to a large extent, of small owners, many of whom are exceedingly conservative, the latter is a serious objection.

A system of applying the power by means of a pulling device upon the bank has, however, recently been invented by a New York man that seems to offer excellent promise of solving the problem. This invention provides a sort of electric mule, which moves upon a single rail and is supplied with a gear engaging with a rack beneath the rail. The rail and rack are raised about two feet above the ground, being supported upon short posts, and attached firmly in position are two copper conductors, which supply current to a motor actuating this device. The motor operates a set of gears and moves the apparatus by turning the gear engaging with the rack. The great advantages of this method of traction are in many respects obvious. The necessity of having a heavy weight with which to procure traction disappears. The motive power, or machine from which it is derived, can never slip, and the energy transmitted through a train of gears to the rack gives us a positive and reliable means of propulsion. Five ordinary canal boats can be moved at the rate of five miles an hour by an electric mule weighing seven hundred and fifty pounds and consuming about eight horse power. The arrangement is readily controlled by a lever operating a switch, the operator sitting upon the locomotive itself, or if necessary light ropes may be run from the lever to the boat and controlled by a man on board.

The electric mule is very compact, being one foot wide, two feet long and about three feet high. The tow line connecting the mule with the boat remains as at present.

The State of New York alone has spent \$9,000,000 in improving the Erie Canal within two or three years, and it is now announced that \$5,000,000 more will be required. The promoters of the system just described claim that \$1,000,000 would pay for the complete installation of that method of electric haulage along the entire line of the canal, resulting in a considerable revenue to the State and immense annual saving to the concerns using the canal for transportation. A successful system of electric haulage on canals would vastly increase the usefulness of artificial waterways all over the world.

### Inquiries from Abroad.

A PROMINENT New York export firm one day recently received inquiries for quotations on a number of manufactured goods from various parts of the world, and, according to a member of the concern, it was only about a year ago they started to introduce American articles into some of the markets in which they are to-day operating successfully. From Johannesburg, South Africa, they have been asked to quote, according to a drawing they have received, on 10,000 galvanized iron buckets. For Ferrara, Italy, they will furnish prices for a complete flour mill. From Dingigue, South India, they are quoting for a plant of metal-stamping machinery for the manufacture of padlocks. This inquiry has been received from a Government contractor. Firms in Colombo, Ceylon, have asked for prices on large pieces of wood-working machinery and a good sized sawmill complete. Other inquiries from the same place have been those of a complete plant of rice cleaning machinery, and three concerns have requested quotations on electrical motors of various sizes.

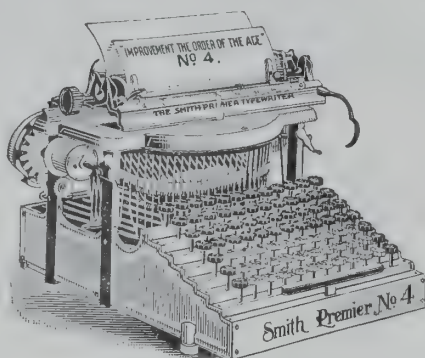


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Our New Catalogue is a complete representation of our business. In it there is at least one illustration of each of our departments, but it would be impossible to illustrate all the innumerable different designs and devices to which our sheet metal building work is applied. Every building has its specific requirements. We meet these conditions by having you send us your plans for estimating on the goods needed in our line. Probably our catalogue would assist in informing you of the desirability of sheet metal work. We will mail a copy free on request, which contains prices, discounts, etc., and solicit your correspondence for information you want on Metal Cornices, Building Fronts, Building Trimmings, Ceilings, Skylights, etc.

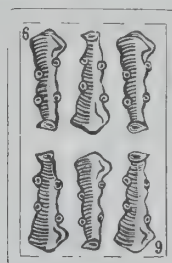
We have been exporting these goods for several years and will fill your order thoroughly, promptly, economically and intelligently.

## GARA, MCGINLEY & CO.,

33 South 17th Street,

PHILADELPHIA, PA., U. S. A.

## SPANISH PLAYING CARDS.



No. 71.

### Los Leones.

Genuine parchment stock; possesses all the finest Spanish qualities; permanent colors; made in three sizes— $2\frac{1}{4} \times 3\frac{1}{4}$ ,  $2\frac{3}{4} \times 3\frac{5}{8}$  and  $2\frac{1}{2} \times 3\frac{1}{2}$ ; hard surface finish; full packs, 48 cards.

Per doz. \$2.25; per gro. \$27.00.

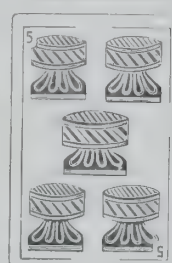
No. 81.

### Colombiana.

Specially engraved faces, after the style used in Colombia and adjacent countries; all the superior qualities of brand No. 71; made in three sizes same as brand No. 71; genuine parchment stock; hard surface finish; 48 cards.

Per dozen, \$2.25.

Per gross, \$27.00.



No. 95.

### Spanish Cards.

Barcelona size,  $2\frac{3}{4} \times 3\frac{5}{8}$ ; finest parchment paper; hard surface finish; full packs, 48 cards; for Monte and other Spanish games.

Per doz. \$2.00; per gro. \$24.00.

TERMS: Cash f. o. b. vessel New York, for shipments of not less than three gross.

For announcement of Playing Cards with American faces, see next issue of this paper.

Makers of over 1,000 different kinds of Playing Cards. Received "Highest Awards" at World's Fair, Chicago.

The United States Playing Card Company,  
CINCINNATI, U. S. A.

## GERMAN - AMERICAN MACHINERY CO., LTD.

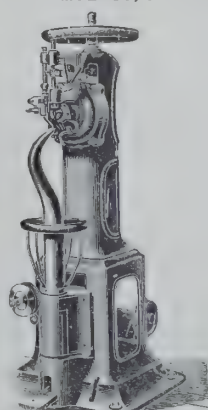
ESTABLISHED SINCE 1862.

FRANKFORT o/Main, GERMANY.

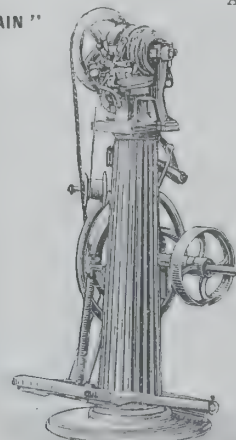
Telegraphic address:

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ABC Code and Staudt & Hundius Code used.



"Allianz" Lock-stitch Sole Sewing Machine No. 386.



"Albrecht" Lock-stitch Fair Stitching Machine No. 391.



Sewing Machine for Turned (Sew round) Work No. 392.

**SPECIALTY:** Machine and complete outfit for all Leather Trades for Boot and Shoe Factories, Shoe Upper Manufacturers, Tanners, Curriers, Belt Manufacturers, Army, Navy and Police Contractors, Saddlers, Harness Makers, Etc.

Catalogues in all modern languages, richly illustrated, and full particulars on application.





UR advice to dealers is to handle Bicycles that are mechanically correct in design—those that have all up-to-date features—no fads, but practical, new improvements that benefit both wheel and rider. Such are.....

**FRAME.**—Best quality of weldless steel tubing is used. Main frame, 1½-inch; head, 1¼-inch; lower rear stays, ¾-inch, D shape, tapered to ¾-inch; upper rear stays, ¾-inch.

**FRAME CONNECTIONS.**—Flush joints.

**SPROCKETS.**—Steel detachable, 20, 22, 24 and 26 tooth front; 8, 9 and 10 tooth rear.

**HANDLE BARS.**—Steel adjustable.

**WHEELS.**—28-inch, fitted with steel piano wire swaged spokes.

**RIMS.**—Wood or steel.

## “Imperial Wheels”

REGISTERED TRADE MARK.



**BEARINGS.**—Disc adjusting, made from best tool steel, scientifically tempered and carefully ground to remove any roughness caused by tempering.

**BALLS** are kept in place by ball-retainers, which, in connection with felt washers, serve as dust shields.

**OIL CUPS** are provided, which convey the oil direct to the bearings.

**HUBS AND CRANK-HANGER.**—Barrel pattern

**WHEEL BASE,** 43½ inches.

**WIDTH OF TREAD,** 5½ inches.

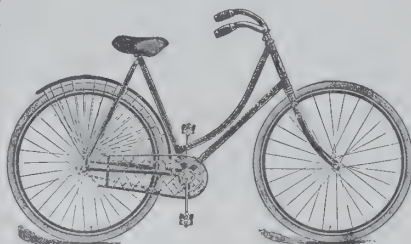
**CRANKS AND SHAFT.**—Two-piece, joined in center.

**FINISH.**—Black, maroon or green, plain or striped and decorated.

**PEDALS** are made rat-trap, so constructed that rubbers can be attached.

**CHAINS.**—Superior make, “B” block pattern, centers and pins hardened

We also make **HIGH-GRADE TANDEM**s and **JUVENILE WHEEL**s.



### LIST PRICES:

IMPERIAL MODELS, Nos. 38 and 39, - - \$75 each.

IMPERIAL MODELS, Nos. 58 and 59, - - 60 each.

IMPERIAL JUVENILE MODELS, 5 and 6, - \$40 each.

IMPERIAL TANDEM, - - - - - 100 each.

Floor space occupies five and one-half acres. Capital invested in the manufacture of Bicycles, \$600,000 dollars. Business established in 1869.

**Special Discount to Reliable Dealers.**

Correspondence solicited.

**AMES & FROST COMPANY, “A” CHICAGO, ILL., U. S. A.**

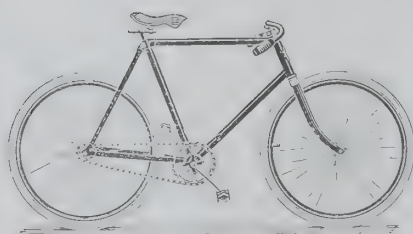
## Our Tribune Bicycles

## THE BLACK MFG. CO.,

ERIE., PA., U. S. A.

are known the world over for their excellent finish and reliable quality.

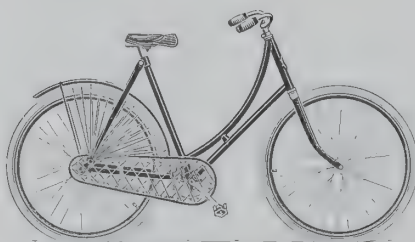
Write for export prices. We deliver our machines properly boxed, freight prepaid, to New York City.



Tribune Model 33. Price, \$50.00.

Model 33 is a bicycle of excellent quality and finish, and far superior to many machines listing at higher price. The frame is weldless steel tubing of best quality, built in two heights, 23 and 25 inches; wheels, 28 inches diameter; gear, 73; cranks, 7 inches. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, gold striped, nickel trimming. Weight, about 23½ lbs.

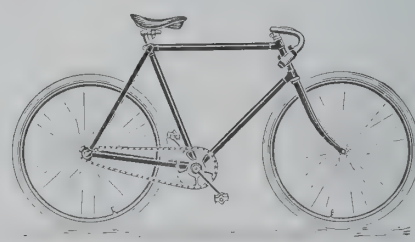
**ARENA MODEL M.** Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 34. Price, \$50.00.

Model 34 is practically the same as Model 33, excepting that it is built with drop frame, 20½ or 22½ inches, for ladies' use. Weight, about 24½ lbs.

**ARENA MODEL L** is very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.

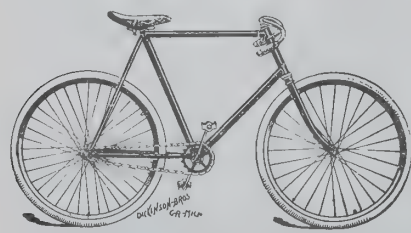


Tribune Model 350. Price, \$75.00.

Model 350 is built for road racing and for all purposes where a light wheel is desired. The frame is built in 23-inch height only. Drop to hanger, 2½ inches; 7-inch cranks; Tribune special single-tube racing tires. Weight, about 21 lbs. Finish, black, gold striped.

**We build also a large variety of higher-priced wheels, including TANDEM, TRIPLETS, ETC.**

Handsome illustrated catalogue describing our full line, MAILED FREE.



Halladay Roadster, \$100. Discount, 45 per cent.



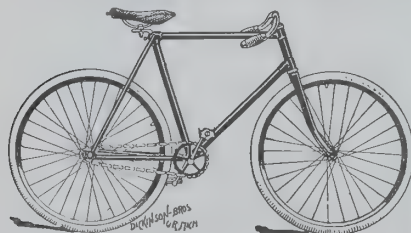
Lady Halladay, \$100. Discount, 45 per cent.



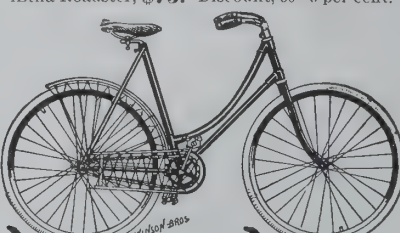
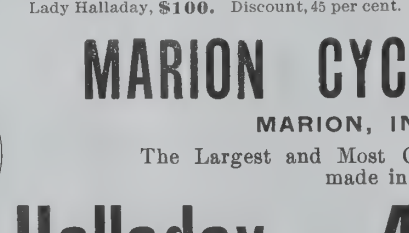
Lady Aetna, \$75. Discount, 50-5 per cent.



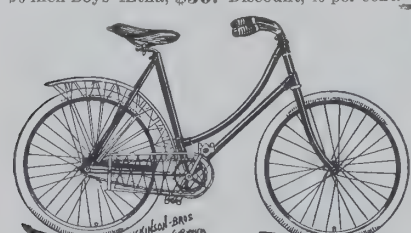
Aetna Roadster, \$75. Discount, 50-5 per cent.



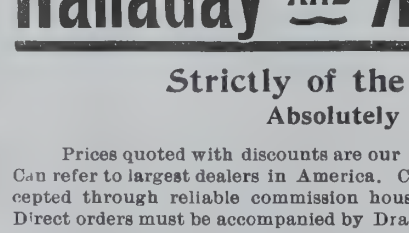
26-inch Boys' Aetna, \$50. Discount, 40 per cent.



26-inch Girls' Aetna, \$50. Discount, 40 per cent.



24-inch Girls' Aetna, \$40. Discount, 35 per cent.



24-inch Boys' Aetna, \$40. Discount, 35 per cent.

## MARION CYCLE COMPANY,

MARION, IND., U. S. A.

The Largest and Most Complete Line of Bicycles made in America.

## Halladay AND Aetna Bicycles

**Strictly of the Highest Grade.  
Absolutely Guaranteed.**

Prices quoted with discounts are our BEST and cannot be beat for quality offered. Can refer to largest dealers in America. Complete line for reliable service. Orders accepted through reliable commission houses. Mail exact copy of order direct to us. Direct orders must be accompanied by Draft on New York or San Francisco. All goods carefully boxed for ocean shipment, F. O. B. New York; or delivered San Francisco or New Orleans, \$1.00 net extra per machine. Send for Art Catalogue mailed free.





## TWO IMPORTANT FEATURES OF THE AMERICAN BICYCLE TRADE.

**T**WO features of the wholesale trade in American bicycles and supplies may prove both interesting and suggestive to the foreign buyer. One of these is the systematic alteration and improvement of the models for each new season, the other the rapid tendency to specialization in the manufacture of bicycle parts and accessories. Each of these has influenced retail trade conditions in America most powerfully—to the benefit of the retail dealer—and if thoroughly understood will benefit dealers in cycles and supplies all over the world.

Human nature is prone to a number of little weaknesses, among which is vanity, a desire to excel or “shine,” and the shrewd bicycle makers have not failed to take advantage of this in conducting their business. For several years past American manufacturers have been in the habit of bringing out a “new model” each year, marked by so many striking improvements and changes that all old models become somewhat old fashioned by contrast, and there is a rush on the part of riders with long purses or keen personal pride to secure the latest wheels.

One of the most trivial, yet ingenious and effective, of these annual changes is in the name-plate. This is now greatly elaborated each year, so that, slight as the change is, a machine with a last year’s name-plate seems almost shabby beside the model bearing the resplendent mark of 1898. As these plates are never sold apart from the wheels, any one wishing to make a present, for example, is practically forced to buy the latest model or expose himself and the recipient to a host of perhaps unintentionally mortifying remarks, such as, “Why, that’s a last year’s wheel!” Without the difference in the plates, few except experts could distinguish between the makes of different years so readily.

The almost universal adoption of wood rims in America led to a great boom, both in new wheels and in the demand for alterations—the one change of course suggesting others—when that important improvement first came out. The wheels proved to be both lighter and handsomer, while improved methods of manufacture are now turning out wood rims as strong and durable as steel. A number of firms make a practice of bringing out a new shade of enamel every season, a pretty device which doubtless tends to increase the popularity of each new model a little. Such a small change as that from the small to large hubs meant a good deal of new business, so skillfully was it brought upon the market.

The great card for 1898 is of course the bevel gear. “Chainless” is the magic word that is to conjure buyers into paying \$100 for a new wheel before the old has received the first puncture to its tires. We are told that scores of firms still hold numerous improvements in reserve, with a view to “bringing them out” at some future time in such a way as to boom the demand for new wheels again.

All this is distinctly in the interest of the enterprising dealer. It gives him something to talk about that is constantly fresh and interesting. There are points and arguments to be made for every improvement. Not only is there an increased chance of selling a wheel to some one who has not yet invested, but last year’s customer may be tempted to take a new one, or at least put a few dollars into equipping his iron steed with all the improvements. We understand that the wealthy classes in many countries, particularly in the large cities, insist on having American wheels. Dealers having such a clientele should by all means see to it that their stocks are constantly replenished with the latest models. “Human nature is

a constant quantity,” and it is more than likely that the arguments that have so unfailingly produced an increased trade in this country will be effective elsewhere. Certainly, this shrewd planning of each year’s campaign is wholly to the dealer’s advantage, if he is only posted and ready to make the most of it.

We venture to add a word of caution. The buyer should in every instance deal with responsible firms. Such houses will supply wheels of sterling quality at prices as low as, or lower than, can be quoted elsewhere on goods of equal merit, owing to the wide use of labor-saving machinery here. The purchaser of a good American wheel will buy the new model of the same make another year. But there are in America, as everywhere else, firms dealing in low-grade goods. The growth of the bicycle trade in department stores gave these firms a strong foothold, the stores advertising “\$100 wheels” at \$19.98, \$16.68 and other ridiculous and impossible prices. Such stock as this is frequently offered to foreign buyers at seemingly tempting prices. It has greatly injured both the dealers handling it and, to some extent, American export trade in honest wheels, and should be refused whenever offered.

The other feature of the American bicycle trade on which we wish to dwell is the steadily increasing volume of business in parts and accessories. The manufacture of wheels has become specialized here as nowhere else in the world. Three firms make nearly all the tubing made in the United States, one of them alone having equipped over a million wheels. Wood rims are turned out at factories expressly built for their manufacture by the hundred thousand, the forests of America being ransacked for the finest selected wood. Tires of a score of makes are on the market, each made by a company devoting particular attention to the business. Two or three of these firms do a huge annual business, and have made their goods familiar all over the world. Chains and chain guards, grips and handle bars, hubs, cranks and hangers, all are manufactured in great quantities by firms making a specialty of each line. The manufacture of pedals is a distinct branch of the trade, while some of the great firms engaged in making saddles overshadow half of the concerns making the bicycles themselves.

This specialization presents very great and obvious advantages to buyers. Cost of production is greatly lessened, while quality is increased. A costly special machine to do each part of the work would not pay at all on an output of a few thousand. But when the output runs into the hundreds of thousands such machinery pays enormously, and the buyer shares in the benefit.

Closely analogous to the parts are the accessories or extras, such as lamps, cyclometers, tools and tool bags, oils and oilers, bells, brakes, toe clips, pumps, cycle stands, enamelling, nickel and repair outfits, and the like. All of these articles are made by firms devoting special attention to the business, and producing superior products at extraordinarily low cost. A single American firm claims to have made and sold 500,000 cyclometers, while the manufacture of bicycle lamps is an immense industry with a yearly output of hundreds of thousands of dollars.

Foreign dealers who have handled these American specialties report themselves as greatly pleased with the result. They lead to a steady business throughout the season, instead of the intermittent business incidental to handling wheels alone. They are usually sold at wholesale at terms that permit of popular retail prices, a great point in effecting ready sales. They are nicely boxed and attractively got up. And one sale frequently leads to a dozen, or, better still, brings general trade. People ask the rider where he bought this or that ingenious contrivance or novelty, and coming to purchase for themselves, buy other articles as well.

The word “American” in bicycle supplies is still a word to conjure with if the dealer is prudent and avoids the cheap trade pitfall. People like to feel that they are using the latest inventions, and whether justly or not, there is certainly a popular impression all over the world that “American” means just that. Wide-awake dealers will certainly do well to post themselves on what America has to offer in new models, parts and accessories, and stock a little in these lines, too, before beginning the season of 1898.



### American Bicycle Machinery In England.

A WRITER in *Engineering*, of London, in speaking of the exhibits at the recent Stanley Cycle Show, makes some very striking comments on the superiority of American machine tools and cycle making machinery, and the completeness with which the American manufacturers of these articles dominate the English market:

"English manufacturers are scarcely represented. American firms, the names of which have now become to us familiar as household words, monopolize practically all the space allotted to machinery. Of this machinery at the Stanley show a fair proportion was in operation, and that was American only, not a single English machine, excepting some special lathe milling machines, situated in a badly lighted part of the ground floor. There was no single screw-making machine or capstan lathe of English manufacture at work, and no large English firm was even represented.

"The well known English firms were all conspicuous by their absence, and with but three or four exceptions the stands occupied were not those of manufacturers, but those of the English agents of American firms. This feature, in truth, has become so common that one expects it and looks for it. But it is not creditable to British manufacturers nor does it augur well for the business of the future. Here is a huge, national industry, which has grown up during, say, about twenty years; there are scores of factories, and many thousands of hands engaged in the manufacture of cycles; yet the best equipped of these factories, the most modern, the most successful, are equipped wholly, or almost wholly, not with English, but with American machine tools!

"The Americans, too, have been so successful in the manufacture of machinery for making English cycles that they are encouraged now to send over the cycles themselves to the market. The American shops are splendidly equipped with the most modern machines, and once they learn the requirements of English taste, they will cater for it, and send over machines for English agents, just as they send over the machinery, the twist drills, micrometer, calipers, gauges and tools for our workshops."

The American lathe, he says, has also gone into the English market to stay, and he declares that it is much handier for use than the standard English makes.

### Export Notes.

**REGULATORS.**—The Foster Engineering Company, of Newark, N. J., has shipped a full line of Foster regulators to their London agent, and the company's agent on the continent has placed orders with the Krupps in Germany, and for the railroads of Russia, Germany, France, Austria, Holland, Belgium and Switzerland.

**RADIAL DRILLS.**—The Bickford Drill and Tool Company, Cincinnati, Ohio, reports the receipt of an order for one of their large No. 3 radial drills from Yokohama, Japan. This, it is stated by their agents in the city named, is the first American radial drill ever placed in Japan. Orders from other foreign countries, such as France, Russia, South Africa and Germany have also been received within the past few weeks.

**MINING MACHINERY.**—Among the latest export work contracted for by the E. P. Allis Company is that of furnishing some more machinery for the South African Consolidated Gold Fields. They have already sold about \$1,000,000 worth of machinery destined for that point, and expect to furnish a great deal more in the future. They are crowded with work, and are building an addition to their shop, which will give accommodation to 600 or 800 more men.

**STEEL BUILDING MATERIAL.**—Mr. Thomas B. Riter, of the Riter & Conley Company, of Pittsburg, has just returned home, having secured some notable orders in Europe. This work marks the introduction of American steel buildings, smokestacks, etc., in the British islands, and includes a building for the Dublin Tramway Company and two 25,000-barrel oil tanks at Rotterdam, Holland. The company is preparing many specifications for similar work in Europe and South Africa. Mr. Riter will visit Europe again next year, expecting to establish branch offices in the more important markets.

**WOODWORKING MACHINERY FOR RUSSIA.**—The Egan Company of Cincinnati, O., has received an important order from the Siberian Railway of Russia for all the woodworking machinery necessary to equip its car repairing shops. Each plant is comparatively small, but there are a great number of them extending along the line as far as Valadastock. Prince Hillkoff, on his recent trip around the world, visited many American manufacturing cities and was greatly impressed with the perfection to which woodworking machinery had been brought in this country, and doubtless his visit had much to do with the placing of the above order.

### Further Uses for Compressed Air.

COMPRESSED air is now being used by certain American toolmakers for performing the feeding, etc., of automatic machine tools. In a screwing machine constructed by a certain machinery company of Cleveland, O., the whole of the tools are thus actuated, the attendant having only to place the blanks in position, when the machine does all that is required. Very rapid work is accomplished, it being stated that no fewer than 7,200 five eighths inch bolts have been threaded in nine hours with a machine having two screwing heads. The same agent is also employed by another American firm for oper-

ating the feed motions and reversing gear of large planting machines. The application of air to the feed motion removes all uncertainty and permits of unlimited range. The driving mechanism also is greatly simplified and the clattering noise and wear of the gear are greatly diminished. The air may be taken from a general supply reservoir or a small pump may be attached to the machine and driven by a belt from a countershaft. The air is forced into a cylinder which controls the whole mechanism. The valve admitting air to the cylinder is actuated by tappets on the planer table. These tappets, instead of shifting a pair of belts, as in the ordinary planer, move the valve lever controlling the air admission to the cylinder.

### A Good Side Line for Bicycle Agents—Carriage Accessories.

IF the bicycle dealer ever awakens to the possibilities of the sundry and small goods market—if he awakens to the opportunities afforded by the thousand and one new articles which are constantly making their appearance, he will better his condition and add perceptibly to his income.

There are numerous small wares made by the sundry manufacturers with whom he deals which, while not of a purely cycling character or analogous, if properly pushed may be used to attract and cultivate an entirely new and desirable class of trade. There are lamps, lamp brackets, locks, etc., which are as suitable for carriages as for bicycles if the carriage owners were made aware of the fact. Another little article of the sort with which it would seem any really live cycle dealer could do no little business at this or any other season of the year is the odometer, or carriage cyclometer. It is very similar to the bicycle cyclometer, registers up to 10,000 miles and is a thoroughly practical instrument. There are few liverymen, physicians, sulky drivers or other carriage owners who would not be interested in the number of miles which their vehicles travel, but the thought of an odometer has probably never entered their heads. The bicycle agents who first convey the idea to them are almost certain of a substantial return for the effort expended.—*The Wheel*.

### A Device to Record Speed.

ONE of the inventions of the season is a speedometer that records the rate at which a bicycle travels. It is a neat device, not unlike a cyclometer, that attaches to the front fork of a bicycle. A small rubber-tired pulley placed in contact with the pneumatic tire of the front wheels set the watchlike mechanism of the speedometer in motion when the bicycle is propelled. Two black pointers on the dial, oscillating back and forth, indicate the rate of speed being travelled in minutes and fractions of a minute per mile, and also the number of miles covered per hour.

A red pointer remains at the graduation, showing the fastest speed that has been attained. The dial faces upward, and the rider by simply glancing down can tell in a flash his rate of speed per mile per hour and the fastest rate he has gone up to that point.

The instrument is not only novel, but will be useful to riders who wish to accustom themselves to certain rates of speed or who go on century runs or long trips for which they have timed themselves. Bicycle policemen using them on the city thoroughfares will be enabled to time a scorcher's gait to a nicety.

The last form of usefulness has already received several practical tests, and at least one unlucky bicyclist was convicted in the police courts of this city on the convincing testimony of this little machine. In foreign cities, where the laws governing speed are very stringent, this device should be in considerable demand, both as a part of the equipage of bicycle police and for the convenience of ordinary riders as well, who wish to go fast, yet keep within the limits prescribed by law.

### New Process for Heavy Guns.

REPRESENTATIVES of the British War Department were recently in Chicago inspecting the model of a new cannon which is at present locked up in a vault in the New York Life Building awaiting transportation to Washington, and thence abroad. Instead of one huge casting and a succession of jackets shrunk upon it, this gun is composed of a succession of thin steel rings, forced upon the central tube by hydraulic pressure. The expensive process of casting, one of the things which makes a modern cannon cost hundreds of thousands of dollars, is entirely done away with. Not having any castings, there can be no flaws, the terror of modern big-gun manufacturers.

The largest piece of metal in the gun is the central tube containing the bore, which is nothing more than a thin steel tube slightly conical externally, with the large end toward the breech. It is claimed that the gun is practically indestructible, and that its cost will be small compared with the present style. The British Government representatives say it will revolutionize cannon making.

—There are indications that the shipments to Japan of railroad material and rolling stock will be quite heavy during the early part of the year. Considerable freight room is being engaged by manufacturers. By one line freight room for forty-three locomotives has been engaged recently; these will go prior to February 28th, according to the contracts of the various makers with the steamship people.





# HOWARD CLOCKS AND WATCHES

furnish the standard time for all countries.

Correspondence solicited.

THE E. HOWARD WATCH & CLOCK CO.

BOSTON—NEW YORK.

Write us in regard to Agencies.

# HOWARD BICYCLES

are the most perfect possible to manufacture.

## FOREIGN AGENTS:

Union Boot & Shoe Machine Co., Leicester England.  
Bicycle Export Compagnie, Hamburg, Germany.  
A. Hermann & Co., Paris, France.  
Comptoir Trio, San Petersburg, Russia.

**Sylph**  
BICYCLES  
BOLTLESS

RUN  
EASY  
\$100.



The Best, Easiest-Running and Highest-Grade Bicycles on Earth Are the '97 "BOLTLESS"

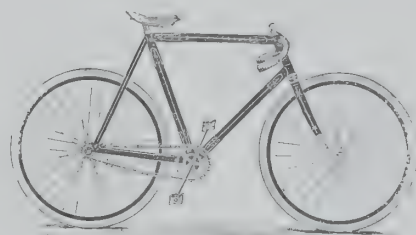
## "SYLPHS."

They contain more up-to-date and practical improvements than any other machines, and are acknowledged to be, both at home and abroad, the finest machines made.

They are ESPECIALLY adapted for Export Trade. We are appointing agencies in many foreign countries, and we want to hear from reliable agents in all countries. Our "Sylphs," together with a full line of "OVERLAND" Cycles, are money catchers, and you will make a mistake if you fail to write us before you contract.

"OVERLAND" Cycles, all sizes, all patterns, \$40.00 to \$75.00.

ROUSE, HAZARD & CO., Manufacturers, Peoria, Ill., U. S. A.



**Hunt**

Saddles Are Famous  
the World Over

FOR THEIR SUPERIOR QUALITY, DURABILITY AND COMFORT.

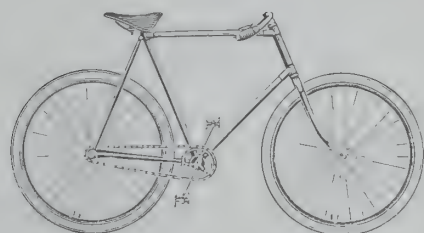
European Agents: MARKT & CO., Ltd., Hamburg, London, Paris and New York.

Send for catalogue showing many different patterns.

HUNT MFG. CO., WESTBORO, MASS.  
U. S. A.



The felt pads are supported on a laced framework of tough but elastic leather thongs.



## OUR WHEELS

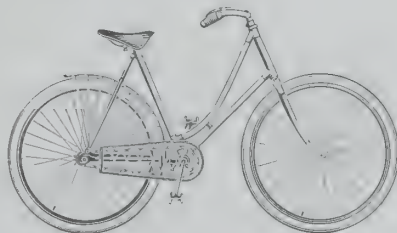
are designed to suit the peculiar foreign climate.

They are strong, easy running and elegant.

Steel rims, front and rear mud guards and brakes optional.

List, \$60.00.

Discount, 50 per cent.



Write for special cash discount and catalogues direct or through reliable commission house, with copy of order to us.

LEAGUE CYCLE MFG. CO., - - Milwaukee, Wis., U. S. A.

# IMPERIAL Bicycle Lanterns

ARE FAVORITES THE WORLD OVER.

**WHY?**

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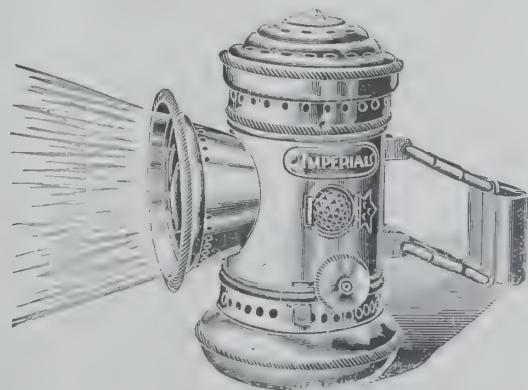
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The only perfect Lubricant for Bicycles, Guns, Sewing Machines, Reels, Etc. Never gums or hardens. For cleaning Bicycles or Fire Arms after shooting. It has no equal. It is transparent and clean to use. Correspondence solicited. Send for Catalogue "C." Order through Export Commission Houses in this country. Manufactured by

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## Electric Power Equipment of a Modern New York Factory.

THE recently erected plant of the American Lithographic Co., on Fourth avenue and East 19th street, may be taken as fairly representative of the best American practice in electric power transmission, with especial reference to city conditions, and, as such, may be interesting to the readers of this paper.

The American Lithographic Co. is the outcome of a consolidation effected in 1892 of ten of the largest lithographic concerns in the Eastern States, operating nine different plants, with all their varieties of product, local conditions, power equipment, etc., while obviously many of the power plants were inefficient with attendant high insurance, poor lighting and other drawbacks. It soon became evident that a consolidation of productive capacity was needed, to secure all the possible and latent economies, and at last in 1896 the construction of such a concentrated building and plant was begun. It was determined at the outset to equip the building throughout with electric power as well as electric light.

The building itself is a fine thirteen-story, steel-frame structure, with basement and roof house, having a frontage of 131 feet on Fourth avenue and 200 feet on 19th street, and being divided to all intents and purposes into two distinct sections or wings, east and west.

The roof house is occupied by the photographic department, and the top floor shelters artists and provers. On the twelfth floor are the stone planers and transfer presses. The tenth and eleventh floors contain cutting, folding, embossing and finishing machinery, and the storage and shipping departments. On the ninth floor are a huge number of type presses. The three floors below are nearly all given up entirely to the mammoth lithographic presses, numbering about one hundred. The fifth and fourth floors house stock and printed material, such as labels, etc. A large part of the third floor carries tons of lithographic stones, with some of the offices, the main offices being on the second floor, with a superb art gallery of famous pictures reproduced by the company. There is a fine large street entrance with grand stairway opening into the art gallery. The first floor has a number of large stores rented to different firms, and finally comes the basement, with its store cellars, machine shop and power plant.

The electric generating plant in the basement of the west wing consists of two 2½x36-inch non-condensing Corliss engines, running at 120 revolutions per minute, each direct connected to a 200 k. w. generator, and one 10x14 inch Straight Line engine running at 285 revolutions per minute and direct connected to a 40 k. w. generator. The Corliss engines are extra heavy throughout to meet the severe conditions. Each flywheel weighs 34,000 pounds, and at the stated speed a very close regulation is obtained, well within the specified limit, viz., 2 per cent. under a variation of load of from 40 per cent. overload to no load, this variation being obtained by tripping the main circuit breaker. The speed is high for Corliss engines, but they work in a most satisfactory manner. The cranks are of the balanced disk type and the steam and exhaust valves are operated by separate eccentrics to increase the capacity of the engines for overloads. An additional safety governor has been attached to each engine, so constructed as to stop the engine by means of a butterfly valve in the steam admission pipe when the engine runs more than 10 revolutions above the normal speed.

The 200 k. w. generators are of the "smooth-body" type, such as are used in Edison central stations, but are compound wound instead of shunt, and are provided with out-board bearings. The data of these machines are as follows: Number of poles, 10; speed, 120 revolutions per minute; height, 99 inches; floor space, 35x146 inches; diameter of shaft, 11 inches; approximate weight of armature, 9,600 pounds; approximate weight of dynamo, 24,500 pounds.

The handsome switchboard is twenty-eight feet ten inches long, seven feet six inches high and is mounted on massive seven-inch metal pedestals. The panels are of black polished enamel slate two inches thick. Each panel, for whatever purpose, is separate and distinct. There are sixteen lightning feeder circuits and sixteen power circuits, besides two elevator circuits. A very complete and admirable system of wiring has been adopted. For each wing on every floor, except the first, the wires proceed to and from a centre of distribution situated within a carefully designed wireway or recess in the walls all the way up the buildings. The recess is five feet wide across the face, and is from four to eight inches deep, allowing at all points 50 per cent. reserve space. This recess, fitted with cast-iron fire stops for the conduits at several stages, is cased in crimped iron, with stout glass doors for access, and each "centre" has iron framework upon which in turn is mounted the panel board of slate supplying the floor. Slate sides make this into a box about two feet six inches wide, four feet high and about four inches deep. The box holds all the small bus bars, switches and fuses for light and power circuits on the floor. In this way the entire wiring system has been made entirely fireproof and of the most permanent and mechanical construction, while always readily accessible.

When it is stated that the building contains 141 power motors, with a total of 847 h. p., it will be seen that here is a resort to electric driving of striking proportions. Over 100 of these motors are direct connected to lithographic and large type presses. The old plants of the company were often operated with a loss in line shaft and belt of 60 per cent. of the full power indicated by the engine when carrying all the machinery loaded; while in slack hours the transmission loss would reach 75 per cent. Moreover, there was the dust and dirt, the obscuration of light by flapping belts and the risk of fire from belt holes in

walls and ceilings. In resorting to electric power it was determined to install no motor of less than 2 h. p., and to group small machinery in blocks of four or five to be run by one motor direct coupled to a short line shaft, thus getting as nearly as might be the benefits of direct connection. The larger motors run up as high as 35 h. p. Upon the lithographic press equipments five speeds can be obtained, so that the output can be varied from 660 to 1,140 impressions per hour. A motion of the controller lever automatically sets the electric brake, stopping the press very quickly, and a movement to another notch causes the press to reverse at a slow speed. The variation in speed is accomplished solely by commutating the field of the motor. The absolute control of the speed and movement of presses obtained by electric control is considered by printers as one of the greatest improvements that have been made upon printing machinery in the last few years, saving both time and annoyance over the old method of shifting belts, foot brakes and backing up by tugging on the flywheel.

So far we have been considering chiefly motors built into the presses and driving the machine direct connected. The numerous ceiling motors are, however, equally interesting. They are all slow speed, as the shafting to which they are coupled runs at moderate speed, varying from 100 to 500 revolutions per minute. The motors are suspended from a framework of special channel and angle iron shapes secured to the steel girders and beams of the building by special beam clamps. Each motor has its own independent bearings, so that it is independent of shafting hangers, the motor shaft being coupled to the line shaft by means of a special adjusting coupling.

In one or two of the applications very slow speed is required, as, for example, in burnishing and calendering. Here spur or special worm gearing is resorted to. In these, as in all other classes of printing trade work, the great regularity of electric power running is found to conduce greatly to the evenness and excellence of the product.

The plant also includes eight electric elevators, in two banks of four each. Two of these elevators are for passenger purposes. The six freight elevators will carry a load of 4,000 pounds at a speed of 150 feet per minute, and have well-nigh double that capacity. The passenger elevators will easily make 250 feet a minute with 3,000 pounds.

Reference has been made from time to time in this article to the features of lighting and of lighting circuit distribution, but emphasis must be laid on the fact that the plant is certainly one of the best exemplifications of interior arc lighting to be found in the world. All the working floors are brilliantly white, and the inclosed arcs shed floods of serene light everywhere. It must be remembered that a great bulk of color printing is done in this establishment, and it is accordingly of the utmost importance that colors shall blend, match, harmonize or contrast in their proper values. Hence, ink mixers and pressmen, who would be working at a great disadvantage with gas or incandescent lamps, can hit the mark just as unfailingly at midnight as at high noon, thanks to the beams of the arcs used. No stint of light is allowed, for on one floor there are no fewer than twenty-eight inclosed arcs lighting thirty lithographic presses. The effect is exceedingly fine.

A plant so well designed and carried out should yield notable economies, and the subjoined data of tests are well worthy of study. The total capacity of the engines is 660 h. p., of generators 440 k. w., and the rated capacity of all the motors installed is 847 h. p. There are 3,000 incandescent lamps and 140 arc lamps connected. During six months of operation the average electrical load at the switchboard has been approximately 200 h. p. and the maximum load at the switchboard has been 2,400 amperes at 115 volts, or 370 h. p. Thus the average load upon the plant is 17.6 per cent. of the total rated capacity of motors and lamps connected, while the maximum load is 32.7 per cent. For the same period of six months from the daily records of power produced, as recorded by the switchboard wattmeters, together with records of weighings of the amount of coal burned, it is found that each electrical horse power hour at the switchboard has been produced by 4.45 pounds of coal. This includes the coal used for starting fires, banking fires over nights, Sundays and holidays, and also includes the running of the small high speed unit for night work at an efficiency considerably less than the large Corliss engine units. Considering alone the operation of the large Corliss engine units in their daily ten-hour runs, during this same period, they show an economy of 3.25 pounds of coal per electrical horse power hour at the switchboard. The coal used is anthracite buckwheat.

Careful comparisons have been made as to the cost of light and power in the new building as compared with the same period of former years. These figures include, for the present plant, the cost of fuel, wages of engineers, firemen and electricians, engineers' supplies and gas bills. The figures for the same period of last year include cost of fuel, rented power, wages of engineers and firemen, engineers' supplies, and gas and electric light bills. Including all of these items, the cost of power and light in this new building per unit of manufactured product is 55.8 per cent. of the previous cost, or a saving of 44.2 per cent. With this marked economy have gone many incidental advantages already hinted at, such as convenience, comfort, greater coolness in Summer, better health of employees, and a decided gain in the quantity and quality of the work, especially that of an artistic nature.—Abridged for THE AMERICAN EXPORTER from *The Electrical Engineer*.

—A St. Louis man has recently patented a device for fastening shoes, by which it can be accomplished by the snap of the finger. The device consists of a double row of groove shaped catches. When the uppers are brought together the catches join, thus fastening the shoe. A leather tongue riveted with buttons passes up through the grooves, and is fastened at the top by the mere pressure of the thumb.



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IN

## TIRES

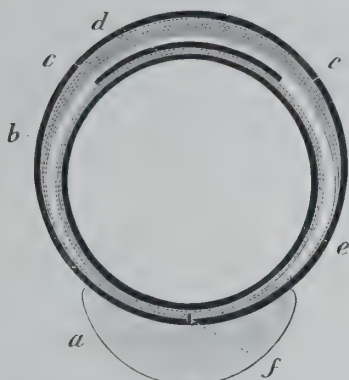


Fig. 1 shows a full-size section of the tire.

- a. Rim.
- b. Protector.
- c. Space between protector and tire proper when fully inflated.
- d. Tire proper with rubber tread.
- e. Air space in tire proper.
- f. Joint in protector, which is removable in case of repair.

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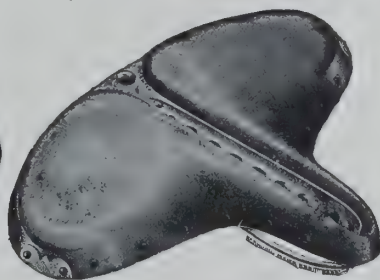
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IT allows the hands to rest on a perfect spring, and while it yields to the pressure of the hands, it does not in the least interfere with the positiveness in steering or guiding the wheel.

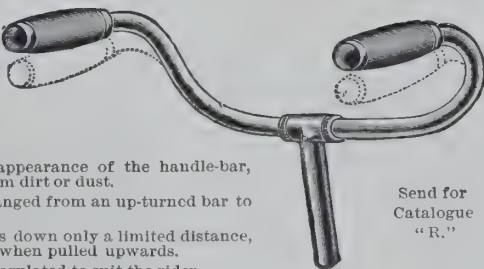
IT contributes ease and comfort while riding, by entirely overcoming any jar, jolt, or shaking of the hands and arms.

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IT is reversible, and can be easily changed from an up-turned bar to a drop bar.

IT is so constructed that it will press down only a limited distance, and then becomes rigid. It is also rigid when pulled upwards.

The tension of the spring can be regulated to suit the rider.



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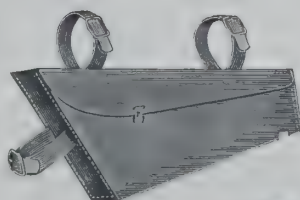
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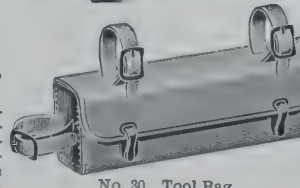
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No. 20. Tool Bag.



No. 30. Tool Bag.

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Do not contract for '97 without getting our catalogue and prices and seeing sample. It is unblushingly and emphatically the best bicycle in the world for the money, and is guaranteed equal to any bicycle in the world. American list, \$80.00. Liberal discount to dealers. Do not be afraid to write. We want your business and will take pleasure in telling you more about our wheel. Address

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### A Great Year for American Iron Mines.

THE year 1897 was one of the most eventful in the history of American iron ore mining. Years ago it was predicted that by 1900 the consumption of iron would be 15,000,000 tons annually, and that ten years later it would reach 25,000,000 tons. Few men believed it then, but now, at the close of 1897, the consumption of ore is at the rate predicted for two years hence. Last year the shipments of ore from Lake Superior mines were 12,500,000 gross tons, and it now looks as if all this quantity, together with 3,000,000 tons more that lay unsold at the opening of navigation last April, might all be used before navigation opens this year.

The total iron ore shipments from the lake ranges for the year just closed have been by water 12,215,645 gross tons, and by rail enough to make a total of an even 12,500,000 tons. This is 2,070,000 tons more than the year that broke all records for iron production and was regarded as a wonder, the season of 1895. The year 1897 differs from 1895 in the further fact that, while at the beginning of 1896 there were millions of tons of ore left unsold at lower lake ports, last year has consumed 3,000,000 tons of this class that was weighing down piers when the year opened, and it closed with the quantity of unsold ore less than has been known for a decade. The country will probably pass into the season of 1898 with piers swept clean, and with a consumption that will demand shipments from the upper lakes of 15,000,000 tons.

The task of handling such a quantity of ore is no small one. Lake railroads are now preparing by improvements costing about \$2,000,000 for the increased business they expect in 1898, and these short lines will carry a traffic that will be the envy of longer lines throughout the country. One little road, the Duluth and Iron Range, hampered by heavy grades and single tracks, and not more than 100 miles long, impeded by the necessity of governing its deliveries of ore by the arrival of ships that were at the mercy of storms and delays, has in the eight months of the ore season hauled 2,650,000 gross tons of ore, not to mention other freight. During the height of the season trains pulled by the heaviest locomotives ever used in America have followed one another over the road every few minutes, while eight or ten ships a day have been loaded and dispatched from the docks. The road is preparing to add 1,000,000 tons to its business for the coming season.

Some sixty mines have shipped ore during the past year from the five lake ranges, but ten of them, owned by seven companies, produced half of it, an indication of the way the mining business is being concentrated into a few hands. This concentration will be more evident next season, when the Carnegie interests begin shipments from their new purchases on the Gogebic range. Each of these ten mines has produced in the year more than 400,000 tons of ore. Mining on the lake ranges began with a few hundred tons of ore in 1854, and up to the close of navigation last year there had been mined and shipped the grand total of 120,000,000 gross tons. The growth of the industry steadily through good times and bad is shown by the fact that more than half the total has been the result of the work of the past seven years. The various iron ranges of the lake country have produced ore as follows for the past year and in their entire career:

Range.	Began in	Product for 1897.	Total.
Marquette .....	1854	2,540,600	50,500,000
Menominee.....	1879	1,911,150	24,000,000
Gogebic.....	1884	2,204,500	23,000,000
Vermillion .....	1884	1,278,500	10,000,000
Mesaba .....	1892	4,281,000	12,500,000

The new Mesaba range, which last year took first place with a record of shipping 34 per cent. of all ore from the lake region, will probably continue its lead. It has the benefit of cheaply worked mines and of the ore wanted by the blast furnace expert. It has seven mines that are worked by the steam shovel, where mining is reduced to so low a cost that the getting out of the ore is the smallest item in its cost at the furnace, even the interest and commission charges being more than the first cost. No such mines are in operation elsewhere, and probably very few more of them will be discovered on the Mesaba.

Ore will probably sell for about 25 cents a ton more in the coming year than during the past, making a difference to the ton of steel of about 50 cents for the raw material. The prices in the past year have been lower than ever known before in this country or elsewhere, notwithstanding the fact that ores of such high average purity as those of the lake district are not mined elsewhere in Christendom. The low prices of 1897 were not necessary, but were due to an attempt on the part of mine owners on other lake ranges to teach the Mesaba miners their place.

The year closes with labor at all ranges well satisfied and with prospects for advances as soon as the conditions warrant them. One advance was given to 3,000 miners a few weeks ago, dating back to December 1st, while miners in other portions of the region were similarly treated not very long ago.—*New York Sun*.

### Mesaba Ore for England.

ONE of the largest orders for Mesaba iron ore ever placed by any firm has lately been received by a Cleveland firm from Sir Lothian Bell, the English iron king. It is the largest order for American ore yet received from Europe, and if this order is worked successfully it is predicted that the American product will soon completely shut out Spanish and African ore. The order calls for 4,000,000 tons of ore, to be delivered free on board docks at Cardiff, Wales,

at \$5 15 per ton. Sir Lothian Bell is constructing immense furnaces at Cardiff, where the ore will be smelted under the Uheling process. Upon receipt of the order the American firm negotiated for the transportation of the ore, and found that they could get it from the lake head to New York at a satisfactory rate. On account of the large wheat shipments, however, no vessels could be secured immediately for transportation of the ore across the ocean. The Cleveland firm is now negotiating for the construction and chartering of vessels, and the first shipment will be made about the first of March. One of the conditions of the order was that the ore should be shipped to the English firm as soon as possible. The deal represents over \$20,000,000 of English money.

### Twenty-five Years' Progress in American Farming Machinery and Methods.

THE editor of *Farm Machinery* recently addressed the Governors of the various American States asking their views upon the progress in American agriculture during the past twenty-five years and requesting a forecast of the probable progress in the same direction during the twenty-five years to come. Many of the answers were striking and suggestive and we venture to print brief extracts from a few of them. While in no sense expert opinions they are the ideas of men who have achieved the highest dignity in their respective commonwealths; men, therefore, of exceptional ability and judgment, and are interesting from the personality of the writers as well as in themselves.

#### THE GOVERNOR OF NEBRASKA:

From the days when man first dug up the fertile soil with a crooked stick and covered the seeds he sowed thereon by dragging a thorny piece of brushwood across the rudely plowed field to these days of gang plows, spring-tooth harrows, disk harrows, press drills and all such kindred machinery many hundred years intervene. But when we reflect that almost all of what we call modern farm machinery is the product of the ingenuity and skill of our people, brought about within the past twenty-five years, we can but marvel at the gigantic strides taken in this direction during the period mentioned and speculate as to what will occur during the next quarter of a century.

We must not overlook the political significance of what has been accomplished during the past twenty-five years and of what will be accomplished during a like period of the immediate future in the improvement of farm machinery and methods and the consequent largely increased production of farm products. It is demonstrated by eminent statisticians that the increase in production of grains and breadstuffs all over the world does not keep pace with the increase in population, but there is no doubt that the American farmer goes better equipped to his task of supplying the world with food than does his brother in any other country. This being so, it follows naturally that year by year the people of foreign countries are becoming more and more dependent upon us for food, notwithstanding the immense areas that are being tilled in Australia, South America, South Africa and India, and I foresee the time, and it will likely come in the next quarter of a century, when the New York price of wheat will be the basis upon which all other countries will figure their prices of that product.

#### THE GOVERNOR OF MISSOURI:

The world's progress materially, intellectually and socially is gauged by the advancement of agriculture, and viewed from this vantage ground the progress of the United States during the past quarter of a century has been phenomenal. If a citizen of our beloved Republic who was fully conversant with all of its conditions and environments had been transported twenty-five years ago to some distant land, remaining till the present time, he could not realize that he was in the midst of former surroundings were he to return to his native home to-day, such has been the change. Primeval forests have given place to thriving cities and towns and cultivated fields, teeming with life and energy. The broad prairies, then the home of the buffalo, the wild deer and the Indian, are now under the skilled culture of American farmers, producing grains, fruits and live stock, from our superabundance of which we help to feed the old world. The then trackless expanse of Mother Earth is now thickly traversed by the steel threads of commerce and communication, the railways and telegraph lines.

#### THE GOVERNOR OF MICHIGAN:

Prior to the War of the Rebellion the farmers of this State had derived little benefit from the use of the improved farm machinery. But the war took from this State nearly ninety thousand men who were in youth and early manhood. A large majority of these were producers at home; they at once ceased to be such, but continued to be large consumers. To meet these changed conditions the genius of the inventor was drafted into action as never before. It also claimed the skill and activity of the manufacturers. Both of these agencies placed upon the market more labor-saving improvements during the years 1865, 1866 and 1867 than during the entire life of the Republic prior to that time. These inventions were born of the necessity of the time. The farmers have been able to largely increase production with less labor. This is specially true with the machinery for cutting and harvesting hay, one of the most important crops of our State. From the time the farmers were compelled to cut their hay with the scythe, spread it with the pitchfork, rake by hand, pitch it on and off with a hand pitchfork, to the present time when all of these things are done by machinery the profits have been largely increased, and now it is difficult to find a man on the farm who is willing to cut grass with a scythe or rake it by



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Preserves and softens the leather, thus adding life.

The highest quality of oil on the market.



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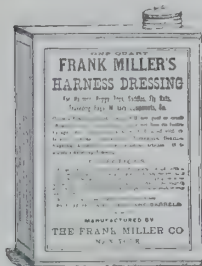
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Produces a brilliant jet-black gloss, which will not peel or smut, and to which dirt will not stick.



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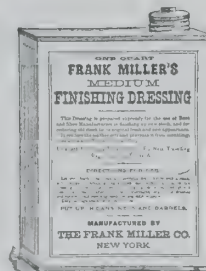
### CROWN Shoe Dressing.

For Ladies' and Children's Black Shoes. Produces a perfect finish, without injury to the finest leather. Each bottle in handsome carton.

### FRANK MILLER'S MEDIUM Finishing Dressing.

For use of Boot and Shoe Manufacturers in finishing new stock, also for restoring old stock to its original fresh and new appearance.

Softens and Preserves.  
Prevents Mould.  
Does Not Scale Off.



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ARE THE

**LATEST IMPROVED, the  
NEATEST, SAFEST, EASIEST**

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**BEST ROLLING LADDERS**

in every respect in the world.

To save delays, order at once with the following measurements, viz: Height from floor to top of base shelf; Width of base shelf to front edge of shelving; Height from base shelf to top of shelf where track is to be fastened.

State the number of feet of track wanted and the length of pieces required, so that joints of track will meet at partitions in shelving. The pieces of track are to be as near to as possible, but inside of 18 feet long. State the number of brackets required to hold up track.

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THE ACT OF CLOSING LOCKS THE TILL.

OVER ONE MILLION NOW IN CONSTANT USE.

No key to  
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Susceptible of  
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Opens like a  
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A terror  
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Handsomely  
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Walnut, Oak  
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cabinetwork,  
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SOUNDS THE ALARM PROMPTLY IF TAMPERED WITH.

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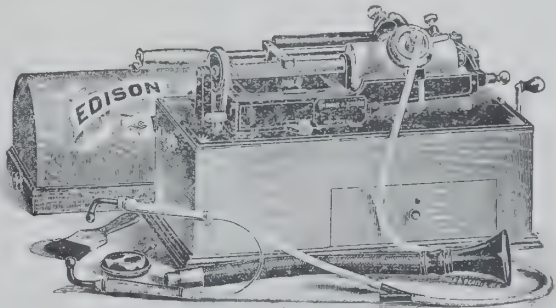
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During the fiscal year of 1892 the exports of farm products amounted to \$796,000,000. Our agricultural exports for the current year will exceed any former year's exportation and may reach the enormous sum of \$800,000,000. The farmers will furnish more than 80 per cent. of all our exports. Verily the farmer is the important factor in producing the nation's wealth, supplying the people's wants and making the future of our country propitious.

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We are an inventive people and quick to adopt anything new or useful, so that I feel no fear that Americans will be outstripped in the race for daily bread through failure to take advantage of what is placed before them.

#### THE GOVERNOR OF KANSAS :

Looking at the future in the light of the past it would seem worse than folly to offer a prediction. If a man had said twenty-five years ago that the farmer of to-day would load hay with a loader, stack straw with the wind, plow corn with a sulky, dig potatoes with a machine, telephone his neighbor on a barb wire or have free mail delivery the man who predicted it would have been considered a fit subject for an asylum. So in view of this fact I do not feel justified in offering a prediction for the future further than that whatever the mind of man may bring forth for the betterment of the human race Kansas will be the first to adopt it and enjoy its fruits.

#### THE GOVERNOR OF ALABAMA :

Looking forward twenty-five years presents to the mind of every thinking man who has watched the progress of the last quarter of a century a wonderful field for the development of our farm machinery.

Electricity will doubtless largely supplant the horse and defy the shadows of night. The plow and the distributor of plant food will probably be united in one compact implement. Machines for gathering all kinds of crops will doubtless reduce the demand for labor. Tramways for marketing will drive out, to a large extent, the wagon.

#### THE GOVERNOR OF ARKANSAS :

It has been estimated that an ordinary farm hand in the United States raises as much grain as three in England, four in France, five in Germany or six in Austria. This fact is not attributable to superior industry or physical powers of the Americans, but simply to the mechanical appliances, improved implements and machinery used by them in agriculture. The world at large, as well as ourselves, has been the gainer by this, as is now evidenced by our ability to feed famished India and drought stricken Russia and Argentina from our overflowing wheat fields and at the same time supply the demand of our own 70,000,000 of people for bread. This would be utterly impossible if the methods of husbandry existing prior to our Civil war were still pursued.

In addition to these advantages coming from improved implements and machinery we must also reckon the comforts and pleasures they bring to our people. The Latin maxim, "dum vivimus vivamus" (while we live let us live), may be applied to other than convivial affairs. In fact is it not our duty to make life as pleasurable as possible consistent with right conduct? And to whom do we owe more for the privilege of thus better enjoying life than to the inventors and manufacturers of labor saving appliances? Along with those who "make two blades of grass to grow where only one grew before" should be classed those who have made this feat so easy of accomplishment.

### The Cylindrical Cotton Bale Again.

IN a recent number of THE EXPORTER we described at some length a new cylindrical cotton bale then just beginning to be placed upon the market. The *Tradesman* reports the success of experiments in covering these bales with material made in the South, thus obviating the necessity of importing jute bagging and iron and steel ties, and reducing the expense of packing by just so much.

The American Cotton Company made experiments covering several bales of round cotton with 68-inch cotton cloth, weighing 15 ounces per yard. The tare on these bales will not exceed 3 pounds per bale. The cloth proved strong enough and makes a good substantial covering. The cost of this covering will not exceed 30 cents per bale. The bale is properly placarded, "No tare, no tariff, no bagging, no ties, all cotton." Visitors are carried away with this wonderful revolution in the cotton industry. The showing of great savings grow day by day, as is proven by actual results. The company is sticking to

their standard 425-pound bale, because the large packages, they claim, are not only inconvenient to handle, but they are an injustice to labor. The 425-pound bales are made to conform to the strength of a man, and all railroad laboring men hail this change with approval. The results of these tests are phenomenal, when it is considered that the old box bale has to be "tared" 25 pounds per bale. The weight of the bale of cotton is also approved by the manufacturers, and both the 4-foot length and weight of their standard bale was suggested and urged by one of the most prominent railroad men in all the Southern cotton country.

### Californian Dried Fruit for Export.

A MOVEMENT is being made, under the auspices of the California State Fruit Growers' Association, to place the export trade in dried fruits upon a sound basis and to present the merits of the Californian fruits more systematically to European buyers. We have already commented editorially upon the great possibilities for American exporters in the fruit trade—American products being practically without competition in this field—and are glad to see that the Californian promoters of the new enterprise appear to be going at the matter in the right way.

They propose that the fruit growers and commission merchants organize so as to insure that only first-class goods be prepared for export, that they be packed in uniform packages, and with a reliable and unchangeable brand. These brands, such an organization would insist, must always be lived up to by a uniform quality sent under them. An effort is also to be made to establish exhibitions of Californian dried fruits in the principal European cities.

The annual dried-fruit crop of California is estimated at 100,000,000 pounds, and there can be little question that all that is needed to open the markets of the world to this great industry is just such intelligent effort as is now proposed. And each market won will be won permanently if such guarantees as to quality and uniformity of product can be effectively undertaken.

One of the first movements of the California Board of Trade toward bringing Californian fruit to the attention of Europe has already been crowned with notable success. One of its exhibits at the Hamburg Exposition was the California process of cooking dried fruit. This attracted notice and Secretary Filcher of the State Board of Trade has now just announced that this process has just been patented in Germany, and a large company has been incorporated to conduct the business on a large scale. It is proposed, after cooking the dried product, to can it. There is a high duty on canned fruit, but the dried article pays but a light one, so in this way the tariff obstacle is avoided. The business seems likely to assume large proportions almost from the start. Recent advices from London announce the success of Californian fruit in that field. After many determined efforts California shippers have been able to lay down pears in London in fine condition. The London *Fruit Grower*, speaking of the fact in a late issue, after referring to the fact that this fruit brought the highest prices in the market, says: "The whole of the fruit was remarkably good, and buyers sought the parcels readily. There is no doubt as to the popularity of these pears in our markets."

### New Steamship Line to Japan.

A FIFTH steamship line between the ports of Japan and those of the United States is to be established by Japanese capitalists. Mr. Asana, president of the Tokyo Board of Trade, is the president and manager of the company, and it is to be called the Tokyo Kisson Kaisha. The first steamer is expected to leave Yokohama in January, and follow the same route as those of the Pacific Mail Line. This will be the third line to San Francisco, the Pacific Mail and the Oriental and Occidental being the other two. There is a fourth line to Tacoma in connection with the Northern Pacific; a fifth to Seattle, in connection with the Great Northern Railway, and the Empress Line to Vancouver, in connection with the Canadian Pacific. The Seattle steamers are also owned and operated by the Japanese, and belong to the famous Nippon Yusen Kaisha, in which the Emperor is a large stockholder, and which has a heavy subsidy from the government.

It is worthy of note in connection with these lines that arrangements have been made with various American railroads by virtue of which it is now cheaper to ship cotton from the Southern States to the Pacific Coast and thence by these lines to the Japanese cotton mills instead of by way of Liverpool and the Suez Canal, as heretofore. It is understood that the steamship companies have bound themselves to a fixed scale of freight charges on cotton shipments to hold for five years. The cotton comes up the Mississippi Valley either by boat to St. Paul, or by rail to St. Louis or Memphis, and thence to San Francisco or Seattle. Another all rail route is via the Southern Pacific from San Antonio and New Orleans to San Francisco.

—The Davis & Egan Machine Tool Company, of Cincinnati, Ohio, have secured an order from the Krupp works, of Essen, for a number of machine tools, through their office at Dusseldorf, Germany. The Krupp works is known to be the largest in the world, employing over 20,000 men, and it speaks well for any American house to introduce their goods into this immense manufactory. The same firm not long ago received an order through their Berlin office for a large line of lathes, shapers, drill presses, etc., for the A. Borsig Company, of Germany. This is one of the largest locomotive works in Europe, employing over 8,000 men. Another recent order was one received through its Amsterdam office for a special turret-lathe for the Netherlands Government.





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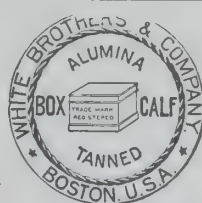
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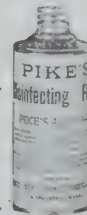
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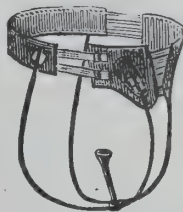
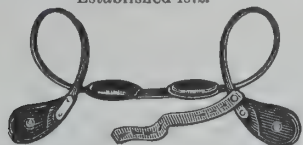
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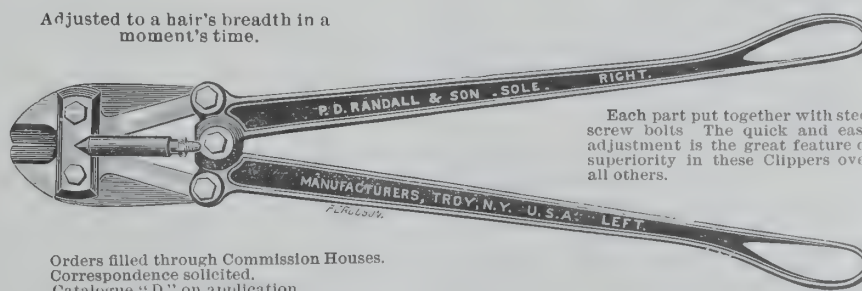
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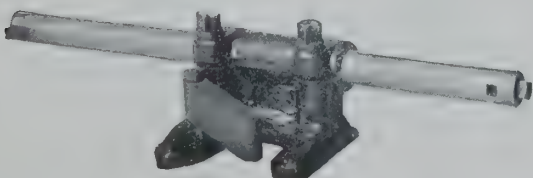
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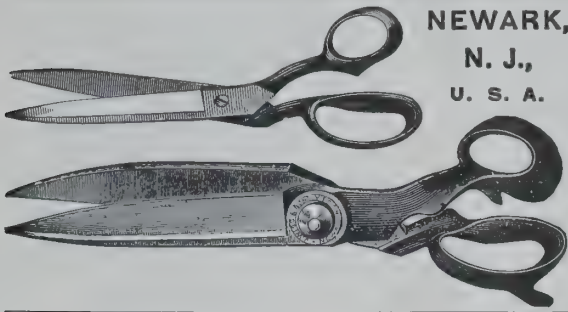
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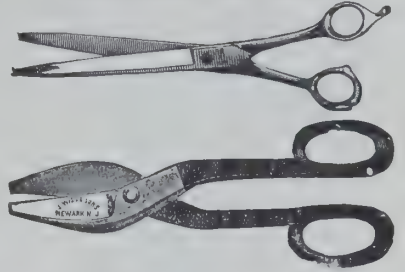
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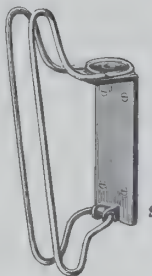
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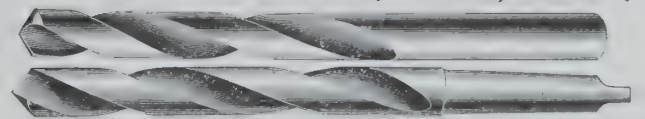
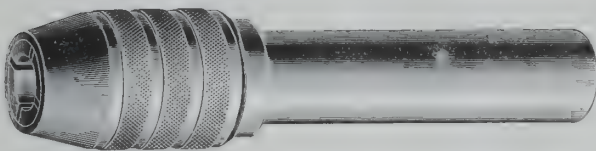
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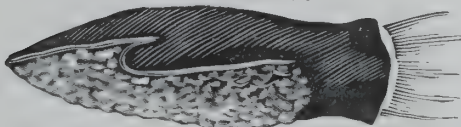


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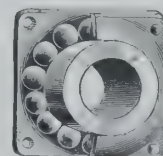
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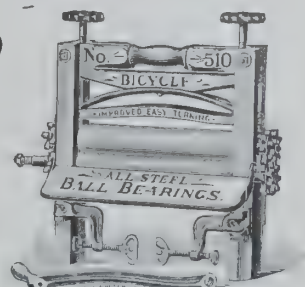
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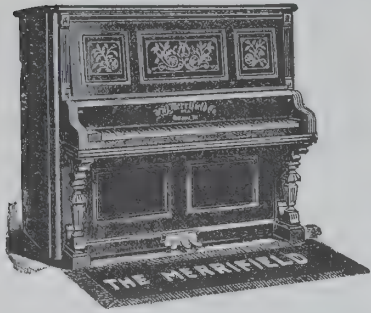
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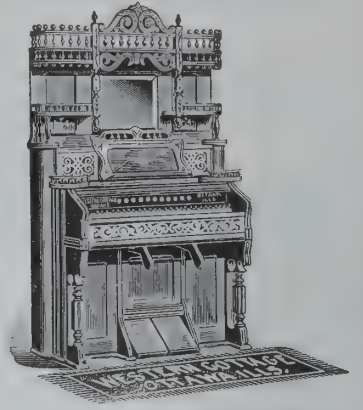
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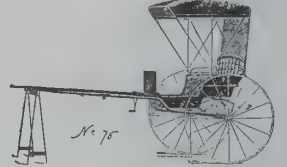
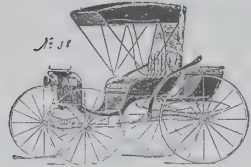
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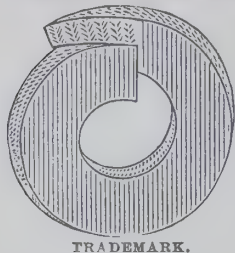
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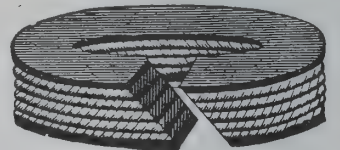
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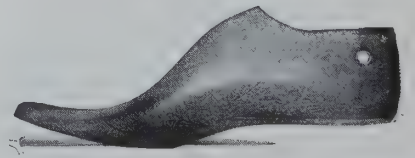
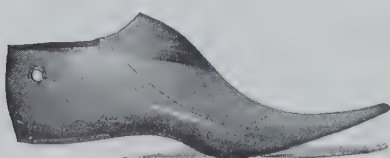
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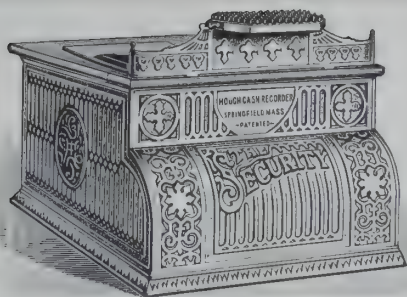
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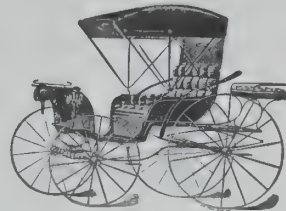
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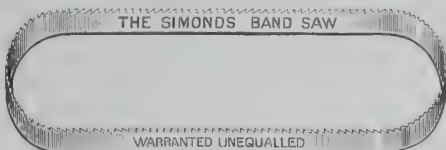
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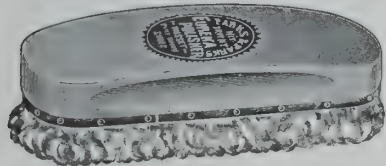
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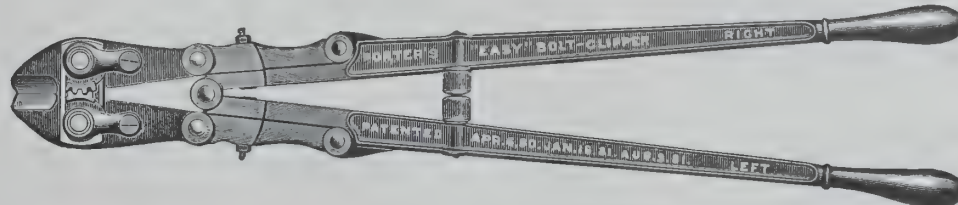


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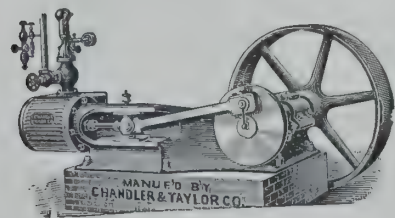
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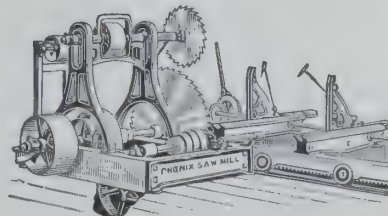
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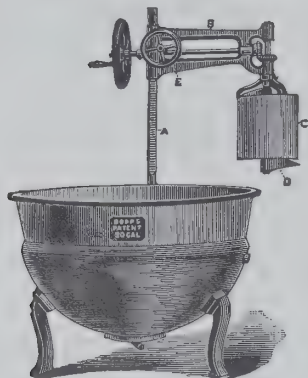
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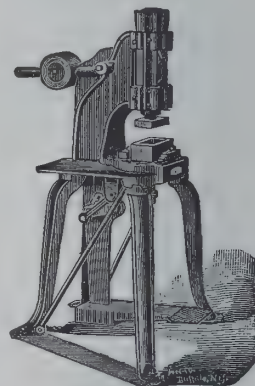
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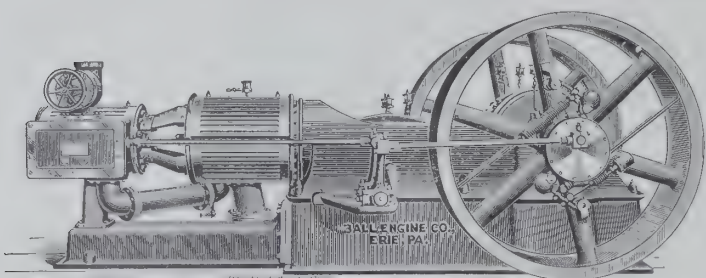
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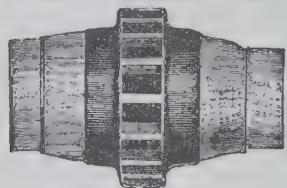
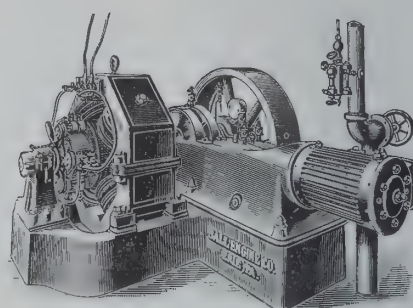
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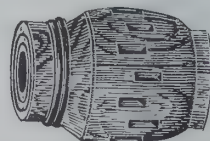
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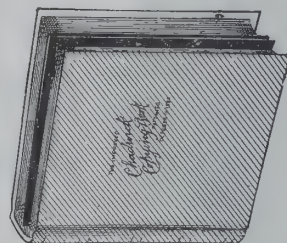


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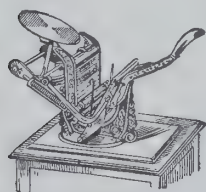


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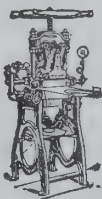


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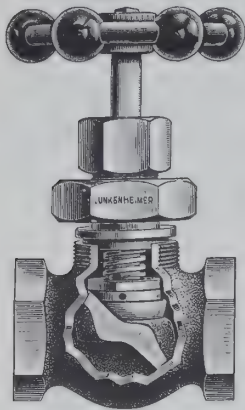


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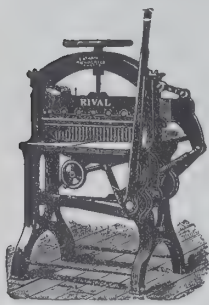
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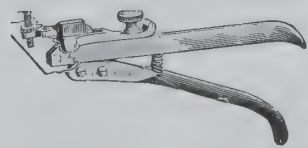
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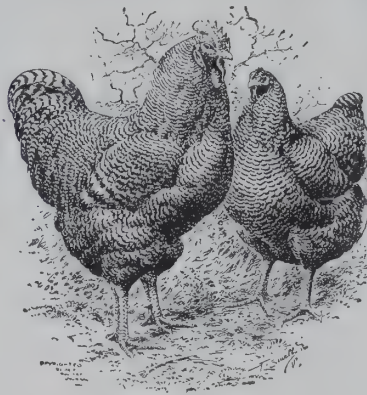
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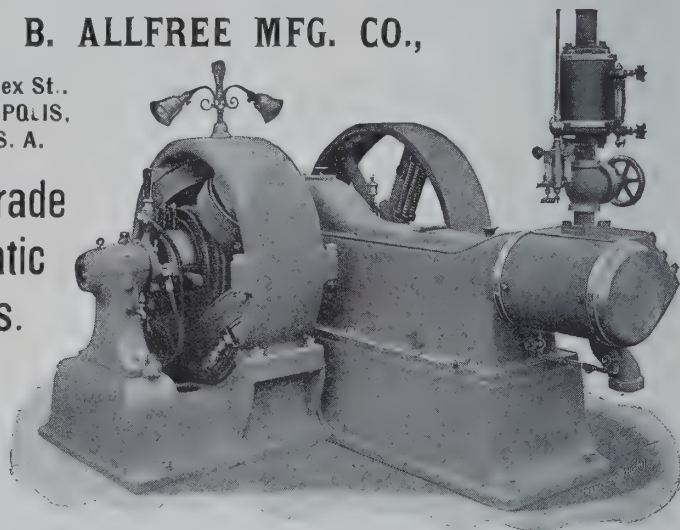
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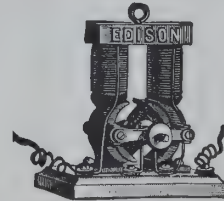
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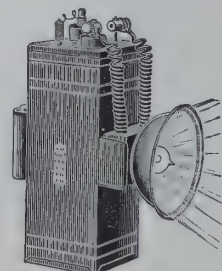
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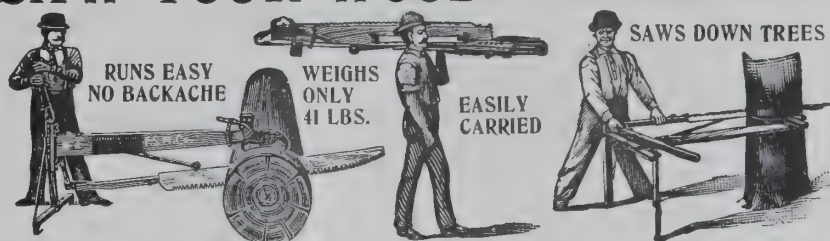
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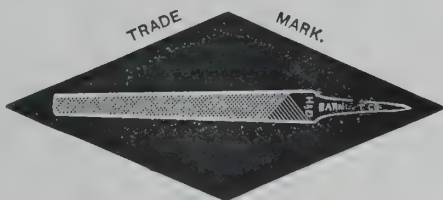


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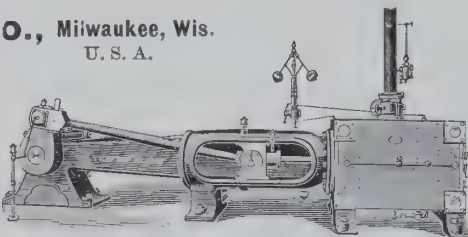
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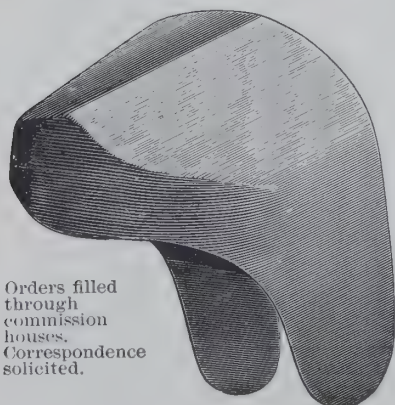
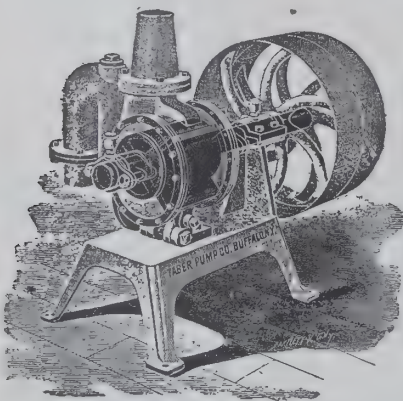
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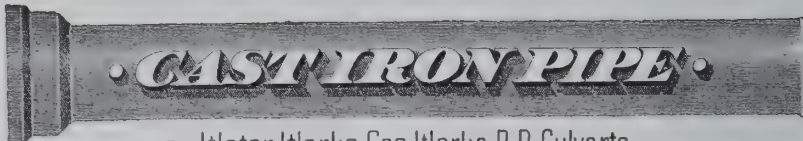
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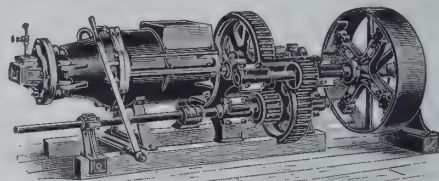
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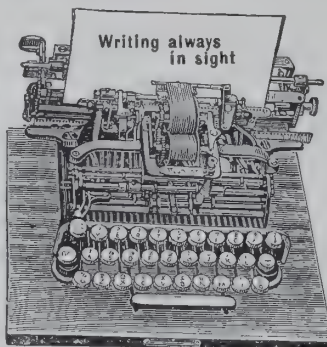
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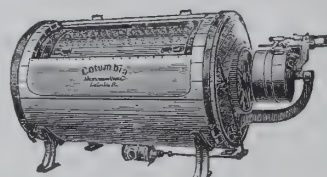
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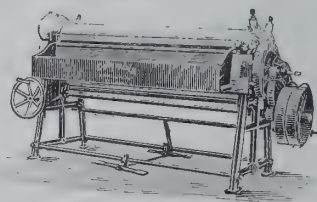
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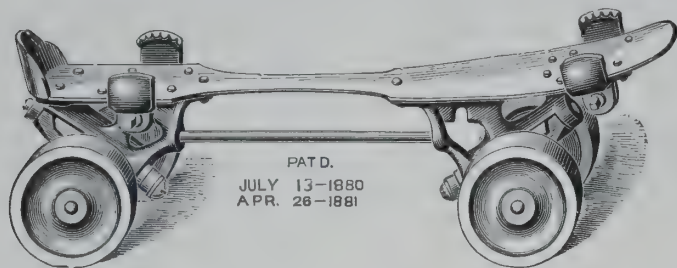
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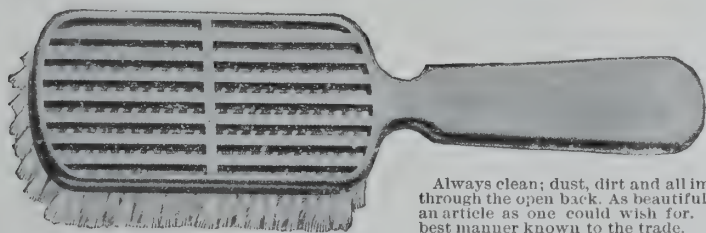
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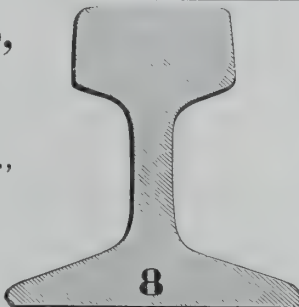
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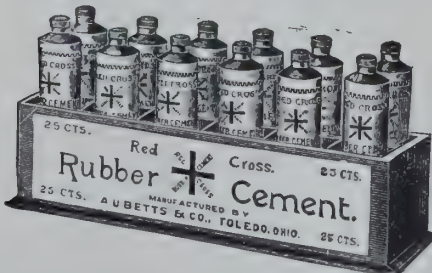
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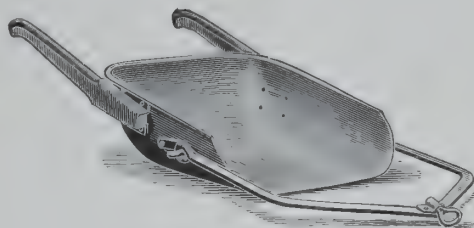
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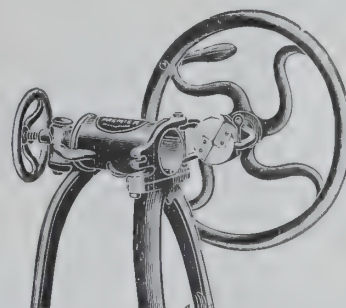
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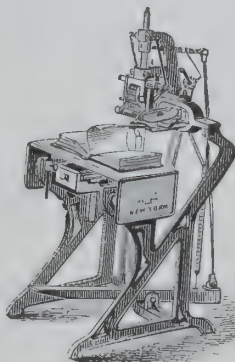
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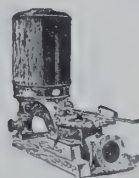
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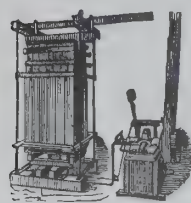
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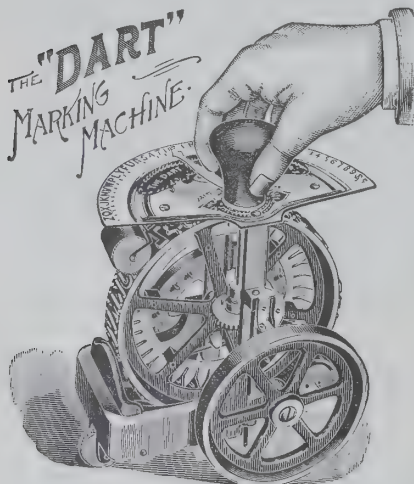
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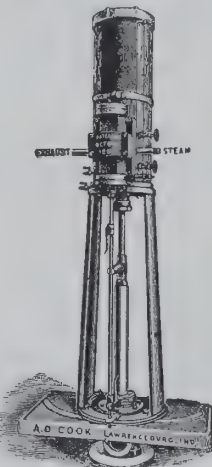
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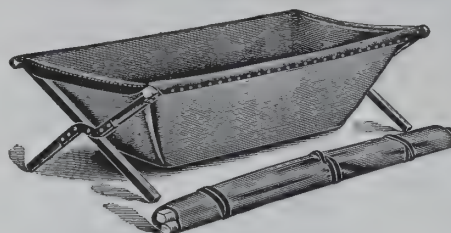
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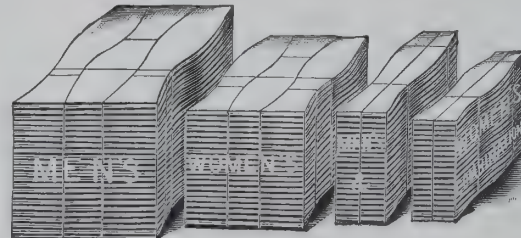
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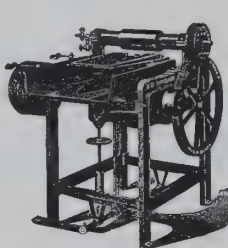
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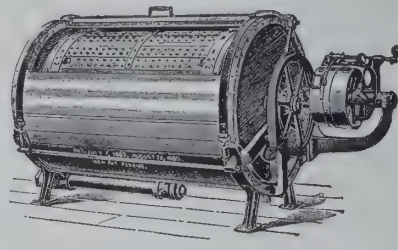
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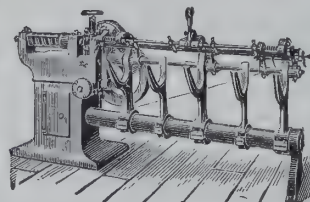
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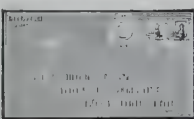
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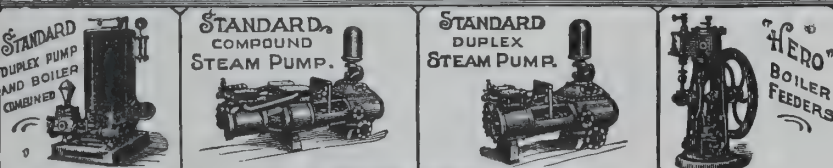
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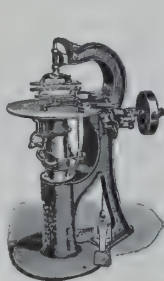
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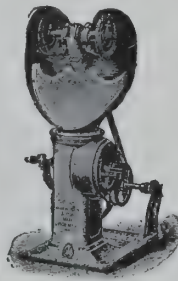
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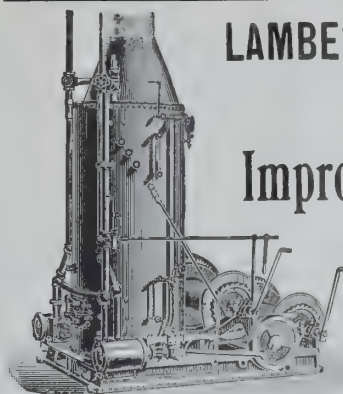
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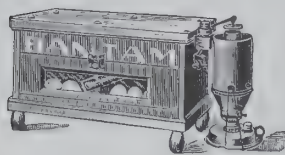


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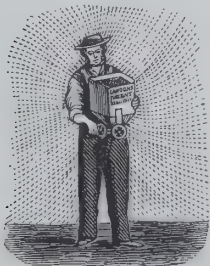
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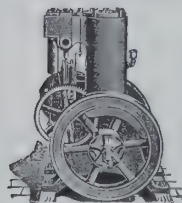
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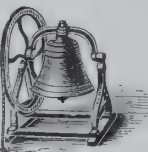
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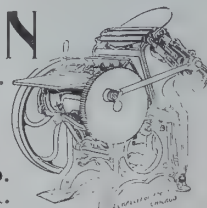
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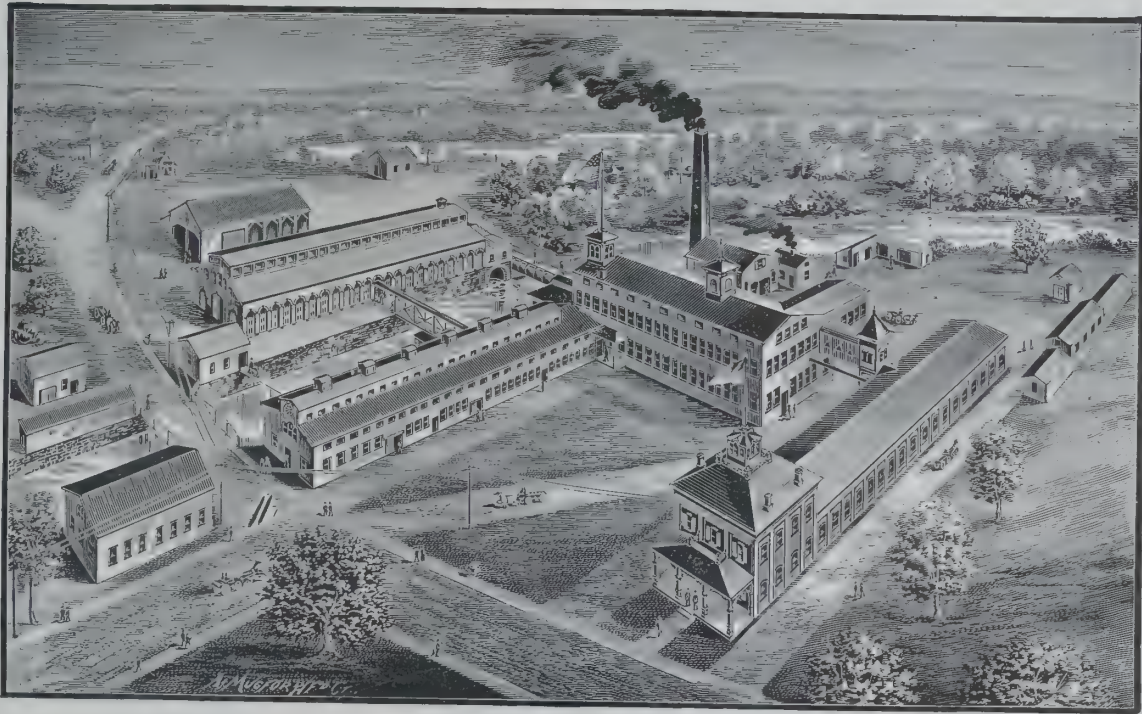
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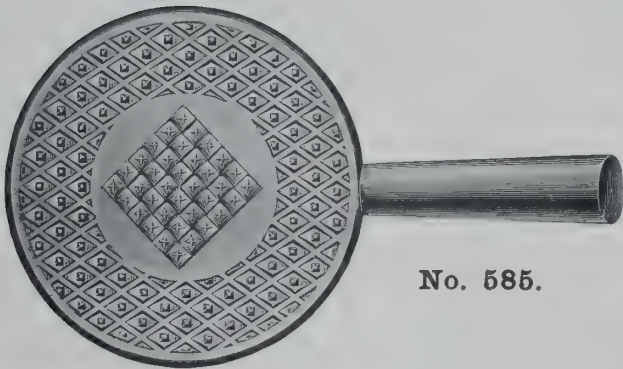


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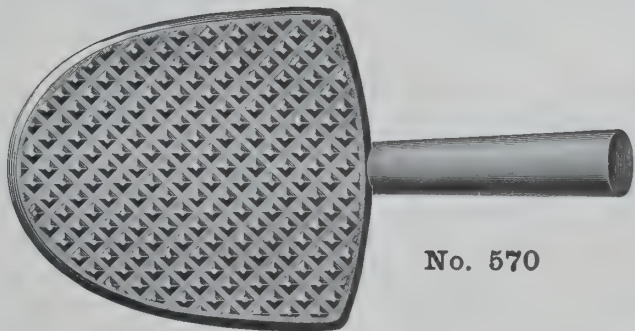


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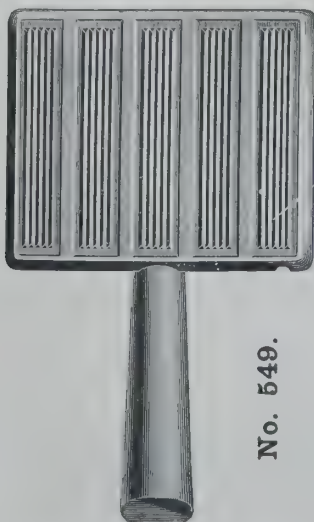
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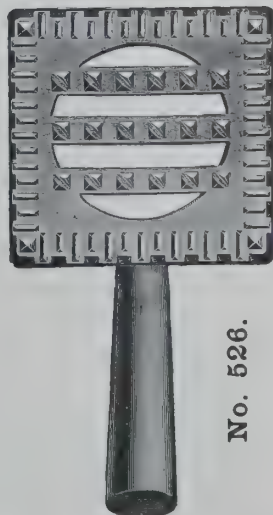
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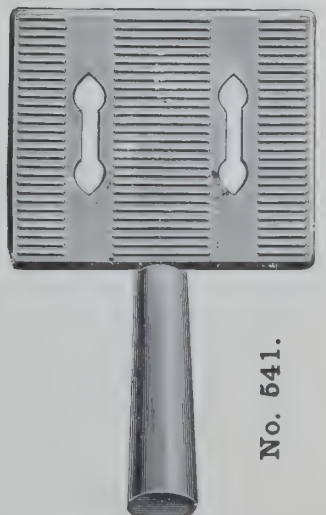
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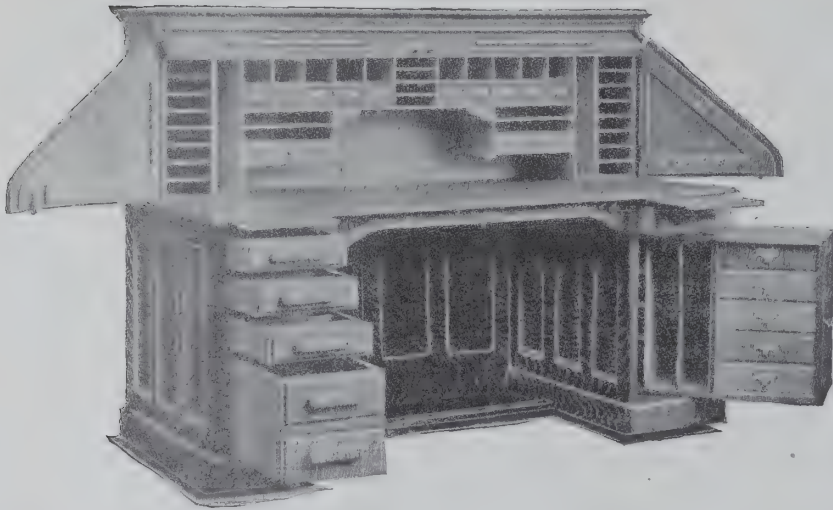


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# DESKS!!

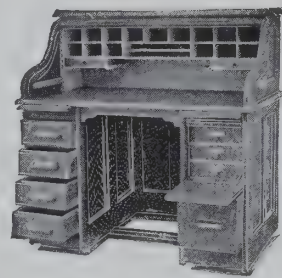
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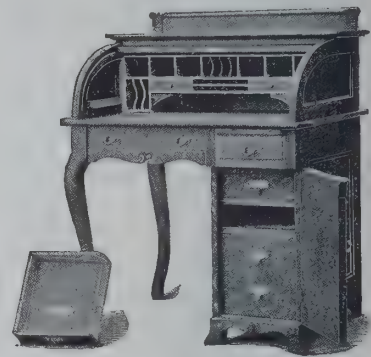
NO. P. 301, "A."

**\$45.00** buys this desk exactly as illustrated. It is 66 inches long, 33 inches wide, 51 inches high. It is made of the finest selected quarter sawed white oak, and has swinging side arms and FIVE COMPLETE LETTER FILES. 66 inches long, style "A," \$45.00. Style "B" or "C," \$41.00. 72 inches long, style "A," \$49.00. Style "B" or "C," \$45.00.



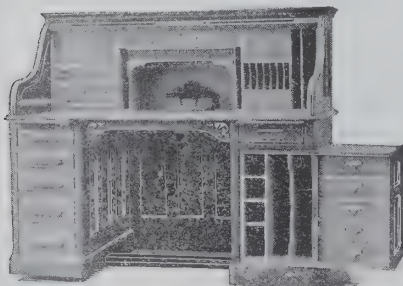
NO. P. 10 E.

**\$19.75** buys this desk exactly as illustrated. It is 48 inches long, 30 inches wide, 51 inches high. It has quarter-sawed oak front, closed back and THREE LETTER FILES in right pedestal under lock and key. This desk has been A GREAT SELLER.



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**\$17.00** buys this desk exactly as illustrated. It is made of quarter-sawed white oak and is supplied with LETTER FILES and large drawer in right pedestal. Size, 36 inches long, 28 inches wide, 44 inches high.

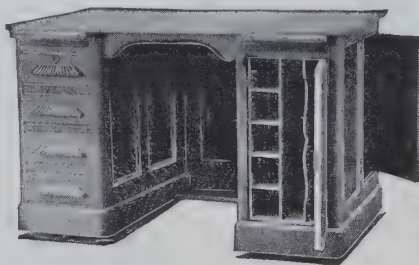


NO. P. 212, STYLE "A."

**\$43.50** buys this desk exactly as illustrated. It is 60 inches long, 33 inches wide, 52 inches high. It is an extra fine desk, made of quarter-sawed white oak and has FIVE COMPLETE LETTER FILES in the right swing pedestal.

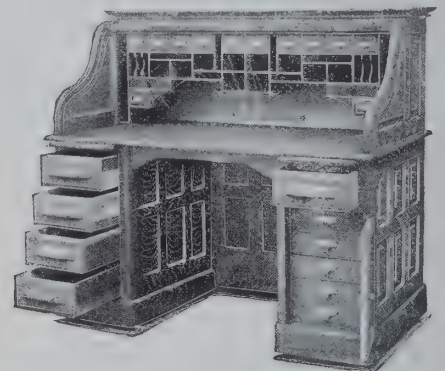
60 inches long, style "A," \$43.50.  
Style "B" or "C," \$40.00

**NOTE.**—Style "A" has drawers in left pedestal and letter files in right pedestal as illustrated. Every person must have some place for letters, invoices, receipts, etc. Style "A" provides complete LETTER FILES within arm's reach, dust proof and under lock and key—a very desirable feature. Style "B" has drawers in both right and left pedestals. Style "C" has drawers in left pedestal and book cupboard in right pedestal.



NO. P. 216 "C."

**\$11.60** buys this desk exactly as illustrated. It is 50 inches long, 30 inches wide, 31 inches high. It has closed back and is made of selected oak. Style "B" or "C," \$11.60.



NO. P. 241, STYLE "A."

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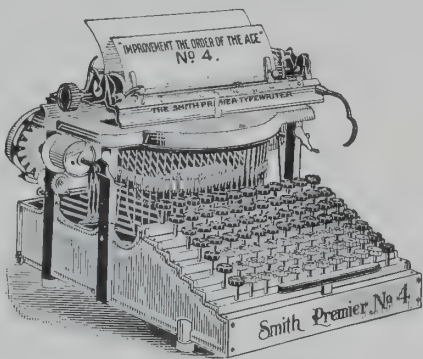


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Under all the Important Failures.

THE  
**COMMERCIAL REGISTERS**  
Contain more than  
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**ENTRIES.**

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BRANCHES in all of the principal cities of Great Britain and Ireland.  
TERMS.—Subscription only, according to requirements.  
PROSPECTUS forwarded on application.

## DRINK PURE WATER

BY USING THE

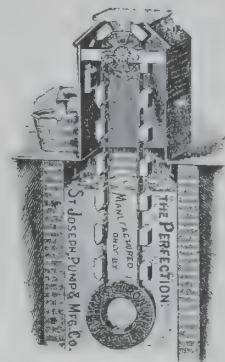
### Perfection Water Elevator and Purifying Pump.

It is the simplest structure for raising water on the continent. Guaranteed never to freeze. Makes bad water good and good water better. It will PURIFY and KEEP PURE the foulest water in any well or cistern. Cheapest pump on earth. Chain guaranteed for 10 years. For circulars, prices, etc., address the sole manufacturers. For delivery f. o. b. New York. In ordering through export commission houses send us duplicate orders.

**ST. JOSEPH PUMP & MFG. CO.,**

ST. JOSEPH, MO., U. S. A.

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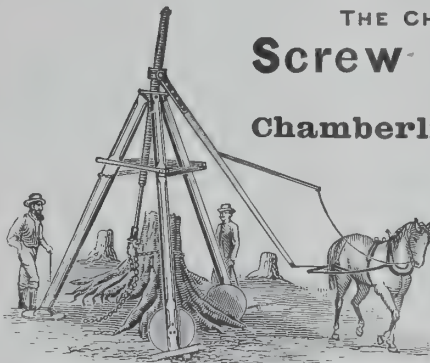
THE CHAMBERLIN IMPROVED

## Screw Stump Puller,

MANUFACTURED BY

**Chamberlin Manufacturing Co.**

OLEAN, N. Y., U. S. A.



Thousands of these Stump Pullers have been sold during the past twenty years, and have been found to be the simplest and safest, most efficient and the most durable of all stump machines yet made. They will pull all kinds of stumps, both large and small, and can be easily moved from one place to another.

Write for full particulars and prices.

The Largest Manufacturers of Playing Cards in the World.

## "U. S." Playing Cards.

No.	American Faces.	First Quality. Per doz.	Per gro.
808.	Bicycle Cards	\$1.05	\$12.60
Ivory finish, highly enameled; used all over the world; sales exceed all other makes.			
188.	Capitol	1.40	16.80
Double enameled, high finish; Club cards.			
202.	Sportsman's	2.00	24.00
Extra enameled; for sporting Clubs.			
303.	Army and Navy	2.40	28.80
All linen; for Clubs.			
89.	Treasury	3.00	36.00
Finest linen; for Clubs and particular players.			
39.	Trophy Whist, French size, 2 1/4 x 3 1/2	2.00	24.00
Fine finish; large indexes; new brand.			
93.	Ivory Whist, German size, 2 1/4 x 3 1/4	2.00	24.00
155.	Tourists, hard finish; for general stores	.70	8.40
145.	Texan, enameled; for general stores	.90	10.80

## "National" Playing Cards.

American Faces.

22.	Rambler, hard process finish	.70	8.40
33.	Apollo, enameled, aluminum surface	.85	10.20
133.	Columbia, French size, 2 1/4 x 3 1/2; enameled	1.05	12.60
144.	Tennis, French size, 2 1/4 x 3 1/2; enameled	1.80	21.60
75.	National Club, regular size, 2 1/2 x 3 1/2; finest Club Cards	2.50	30.00

TERMS: Cash f. o. b. vessel New York, for shipments of not less than three gross.

For announcement of fine Spanish Playing Cards, see next issue of this paper.

Makers of over 1,000 different kinds of Playing Cards. Received "HIGHEST AWARDS" at World's Fair, Chicago.

**The United States Playing Card Company,**  
CINCINNATI, U. S. A.

# B.F. BROWN & CO.



Manufacturers of the Celebrated

## FRENCH DRESSING

AND

## SATIN POLISH

FOR

**LADIES' AND CHILDREN'S  
BOOTS AND SHOES.**

MANUFACTURERS OF

## ARMY and NAVY BLACKING.

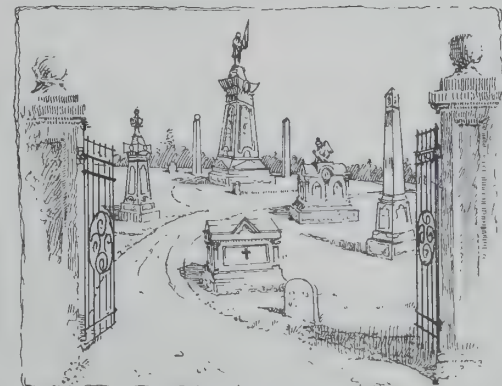
Boston, Mass. London, Eng.



## Every Cemetery

with its crumbling  
monuments and grave-  
markers is an argu-  
ment against stone and  
in favor of

## WHITE BRONZE.



**WHITE BRONZE** is the trade name for a metal with self-preserving qualities and will last just as it is, in color and substance, while time lasts. That has been proven by time and scientific tests. Stone decays and thus loses the records and defeats the very purpose of the monument. **White Bronze** will not absorb moisture, get moss grown, nor decay; it is imperishable. The lettering on **White Bronze** monuments is all raised and legible; the name tablets can be removed and new ones made with additional names, insignia or lettering. **White Bronze** has many other desirable features, as is set forth in our illustrated Catalogue, which will be mailed you free on request. It contains illustrations, prices, discounts, weights, opinions of buyers and scientific men, and probably all the information you will need to make up your order. You should thoroughly investigate to this subject before contracting for your monumental work.

## PHILADELPHIA WHITE BRONZE MONUMENT CO.

33 S. 17th St., Philadelphia, Pa., U. S. A.



# WHITTEMORE BROS. & CO.

The Oldest and Largest Manufacturers  
of Boot Polishes in the World.

237-243 Albany St., BOSTON, MASS., U. S. A.

Wholesale Manufacturers and Exporters of the following STANDARD BRANDS  
for BOOTS, SHOES and HARNESS:



## "GILT EDGE" OIL POLISH,

for ladies' and misses' shoes, is far superior to all others, as it blacks, polishes, softens and preserves the leather. Bottles hold about DOUBLE the usual quantity. Price per gross, \$16.00; discount 10 per cent.

## "SUPERB" PATENT LEATHER POLISH.

The only article that will produce a quick, brilliant and waterproof lustre without injury to the leather. The professional bootblacks of the United States use far more of this article than all other makes combined, because it



polishes quicker and easier, and requires less of it to do the work. Large size, per gross, \$8.50; discount 10 per cent. Small size, per gross, \$5.00; discount 10 per cent.

## OUR "STAR" COMBINATION



package contains a 2-oz. bottle of russet leather cleaner and a small decorated tin box of russet leather polishing paste. The cleaner removes the dirt and stains, and the paste adds a bright, durable and waterproof polish. Price per gross, \$8.00; discount 10 per cent.

## RUSSET LEATHER POLISH

for giving russet shoes a brilliant, durable and waterproof polish. A thin coating of this polishing paste will produce an elegant and lasting polish. Try it once and you will never be satisfied with any other polish. Price per gross, in our large size decorated tin boxes, \$8.50; discount 10 per cent. Small size, \$5.00 per gross; discount 10 per cent.



**FRENCH GLOSS.** Warranted fully equal to the best \$9.00 black dressings in the market (and put up handsomer). With handsome three-color lithographed cartons and wood caps over corks. Price per gross, \$8.00; discount 10 per cent.

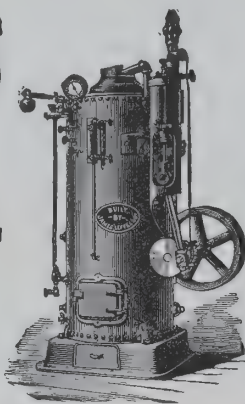
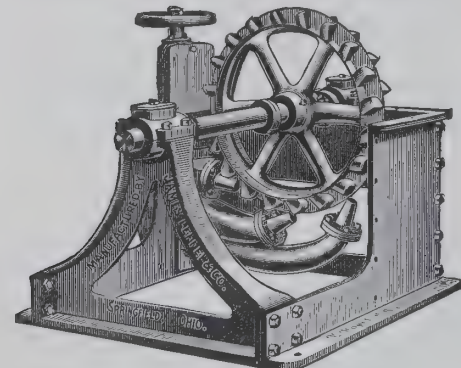
Also Manufacturers of SPECIAL POLISHES for Chocolate, Ox-Blood, Green, Brown, Blue and Purple Russia Calf, Vici Kid Leather, etc. "ELITE" Combination for Box-Calf, Black Vici Kid, etc.; also Dyes for converting light shades of leather into any of the above-mentioned colors.

All first-class articles that suit every one. If you are not suited and want the best, send us a trial order. Orders can be sent through any commission house in New York or Boston. Send for Illustrated Price List.

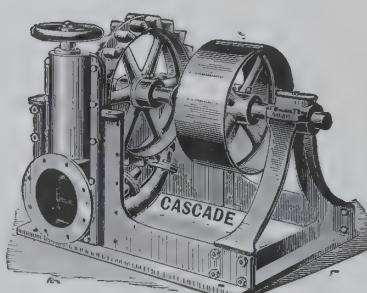
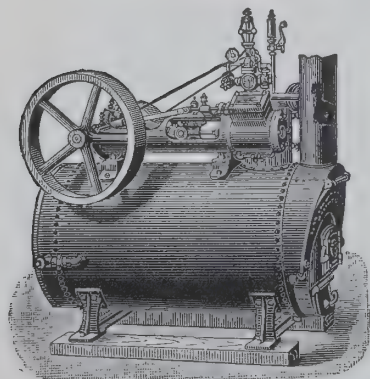
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ALL SIZES AND STYLES  
FOR ALL HEADS

From 2 Feet to 2000 Feet.



Steam Engines  
and Boilers from  
3 H. P. upwards.



Correspondence in English, Spanish, French or German. English or Spanish Catalogue "F" gratis on application. Address,

**JAMES LEFFEL & CO.,**

Hydraulic and Mechanical Engineers,  
SPRINGFIELD, OHIO, United States of America.

## AMERICAN NOVELTIES.

# PHILADELPHIA NOVELTY M'F'G CO.

Thirteenth & Noble Sts., Philadelphia, Pa., U. S. A.

## NOVELTY INKSTAND No. 3.

Novelty (Self-closing) Inkstand No. 3,

(SMALL),  
Retail, 35 cents.



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(LARGE),  
Retail, 75 cents.

## PATENTED SPECIALTIES FOR EXPORT.

All our goods, numbering more than 50 different articles, are patented, controlled and manufactured exclusively by ourselves, and are sold all over the world, about one-half of our business being for export. They are all standard novelties in every sense of the word, and have been awarded numerous premiums at the universal exhibitions of Sydney, Melbourne, Adelaide, Barcelona and Paris, for novelty, workmanship, finish, simplicity, utility and cheapness.

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Novelty Paper Fastener, \$4 per doz.; Keystone Paper Fastener, \$6 per doz.; Original Paper Fastener, \$12 per doz.; Novelty Staples, 15c. per 1,000; Novelty Suspension Rings, 30c. per 1,000; N. Paper Clip, 75c. per doz.; P. Paper Clip, 50c. per doz.; Novelty Pin Clip, 90c. per doz.; The Auto File, \$1.50 per doz.; B B C Paper Clip, \$1.50 per doz.; Balancing Board Clip, \$2, \$2.25, \$2.50 per doz.; Upright Paper Clip, \$1.50 per doz.; Accumulator Bill File, \$1.50 per doz.; Standard Pen Rack, \$1.75 per doz.; Spring Folding Pen Rack, \$2 per doz.; Combination Paper Weight and Clip, \$4 per doz.; Pocket Book Postage Stamp Holder, \$1 per doz.; Automatic Fountain Penholder, \$1.50 per doz.; Novelty Inkstand No. 1, \$6 per doz.; Novelty Inkstand No. 3, \$3 per doz.; Novelty Slate Pencil Sharpener, 40c. per doz.; Vest Pocket Glass Cutter, 90c. per doz.; Novelty Pocket Knife, \$4 per doz.; Novelty Hunting Knife, \$8 per doz.; Novelty Pocket Screw Driver, \$4 per doz.; Artists' Rotary Kit, \$5 per doz.; Self-Locking Door Indicator, \$2.50 per doz.; Madame Louie Hair Crimper, \$2.50 great gross; Novelty Stitched Hair Crimper, \$1.50 great gross; Automatic Fisher, \$1.50 per doz.; Automatic Towel Holder, \$1 per doz.; Suspension Gas Wrench, 60c. per doz.; Novelty Skein Holder, \$4.80 per doz.; Keyring Door Securer, \$1.50 per doz.; American Mincing Knife, 1, 2 and 3 blades, 75c., \$1.25 and \$1.75 per doz.; The Masticator, \$1.75 per doz.; Duplex Can Opener, 30c. per doz.; Universal Wardrobe Shelf Bracket, \$1.50 per doz.; Double Match Box Bracket, \$2 per doz.; Universal Washer Cutter, \$8 per doz.; Novelty Pen Puller, 40c. per doz.

Discounts 20% from above list. Send your orders through any responsible U.S. export commission house. All such houses in New York handle our goods. Catalogue free. New articles constantly appearing. Goods shipped to all parts of the world.

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Improved Crystallized Eggs.

# Crystallized Eggs.

Simply fresh candled eggs removed from shell and dessicated; staple in markets of United States; used for thirty years by all leading bakers; used for every purpose that the fresh shell egg may be used for, including scrambling, omelets and custards.

# Crystallized Eggs.

Keep in any climate; unexcelled for bakeries, army, navy, hospital, sea or family use generally.

No breakage, always reliable and evaporated in the lowest egg market in the United States, therefore cheap.

In the United States sold only in barrels of 250 pounds, equal to 1,000 dozen eggs. For export, packed in tins to suit.

FOR SAMPLES AND PRICES ADDRESS

**C. FRED LaMONT EGG CO.**

ST. LOUIS, MO., U. S. A.





Price, boxed for Export,  
**\$23.50**

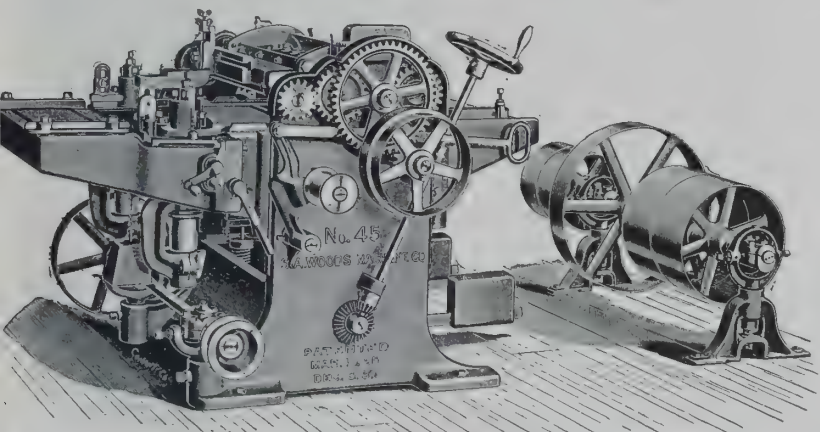
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New York.

**No. 146.**—A complete Desk and Five-Drawer Letter File Cabinet at the price of an ordinary Desk. This Desk is a complete office in itself; is made of quarter sawed white oak, finished antique and polished, and possesses all the features found in any first-class desk. You can make no mistake in ordering at this price.

## E. H. STAFFORD CO.

Send draft or U. S. references  
with order.

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**No. 45.**—Planes one side and matches up to 12 inches wide. Works 6 inches thick, or will plane one side 24 inches wide without matching. Weight, 2,700 lbs. Packed for sea shipment. Measures 160 cubic feet. All goods delivered free on board steamer.

We build a complete line of SUPERIOR

## Wood-working Machinery.

A complete catalogue free.

## S. A. WOODS MACHINE CO.

BOSTON, MASS., U. S. A.

## "NEW JERSEY" COPPER PAINT

LEADS THEM ALL,

So our Testimonials Say.

We guarantee this Copper Paint to be the easiest to apply and, owing to its being so finely ground, it is the smoothest paint in the market.

Highest Medals from American Institute, New York City.

**NEW JERSEY RED COPPER,**

For Yachts. Brightest Color Made.

**NEW JERSEY SEAM PAINT,**

A Perfect Substitute for Pitch.

**NEW JERSEY PAINT WORKS,**

HARRY LOUDERBOUGH, Proprietor,

JERSEY CITY, N. J.

U. S. A.

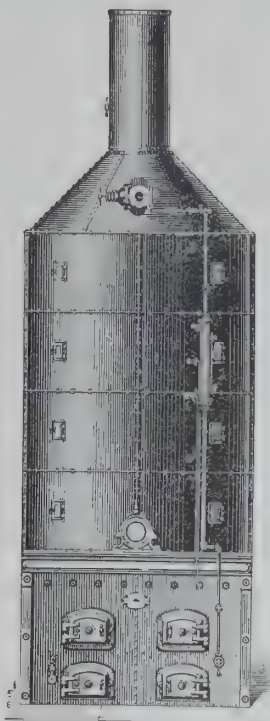
### REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.

MILLS EDWARD. Master Schooner "Florence Shay."

## THE HAZELTON OR PORCUPINE High-Pressure WATER-TUBE BOILER.



EQUIPPED WITH

SQUARE FURNACE,  
SQUARE GRATE SURFACE,  
STEEL JACKET, LINED WITH BRICK.

SINGLE BOILERS or  
COMPACT BATTERIES.

GREAT SAVING OF  
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A HIGH-CLASS BOILER

WITH AN

UNEQUALED RECORD.

The Hazelton or Porcupine Boiler and the Stillman Bagasse Furnace have an unequalled record on Sugar Plantations.

Send for our new book,  
"THE GENERATION OF POWER."

## THE HAZELTON BOILER CO.

Established 1884. Sole Proprietors and Manufacturers, Incorporated 1898.

Builders of STACKS, TANKS and MISCELLANEOUS METAL WORK.

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Cable Address: "PAULA," New York.

Use "A.B.C. Code, 4th Edition."

NEW YORK, U. S. A. **O. B. STILLMAN, Agent,** HAVANA, CUBA  
18 William Street. Apartado 396,  
22 Mercaderes.



## CHEAP PRINTING.

Hand presses, easy to use by man or boy. Type-setting and good printing easy by full printed instructions sent.

5x8 inch press, for cards, circulars, etc., with 7 styles of type, ink, etc., \$40.00.

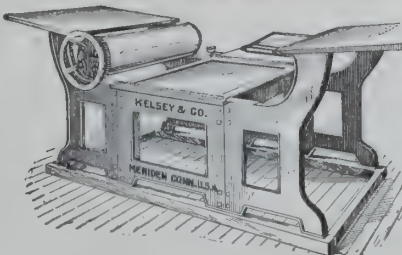
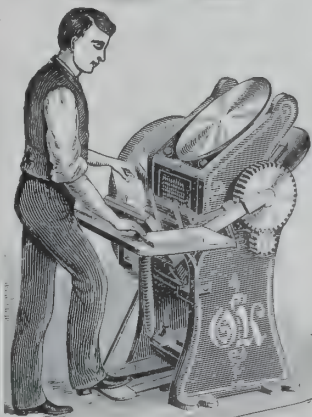
10x15 inch press, with 10 styles of type, ink, etc., \$125, or with more type, rules, etc., for small periodical, \$200.

## PRESS O. K.

A rapid modern rotary press. Best in the world. Price, with 15 styles of type, all accessories for general printing, \$200. Chase 9x13 inches. Larger press, similar system, chase 11x17 inches, \$400, outfit included.

## CARD AND PAPER CUTTER.

Good hand machine with 24-inch steel knives, \$12.00.



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For newspapers and large announcements. Bed, 29x43 inches. Price, \$50.00. Includes 300 pounds small type, 25 fonts assorted types, inks, rules, etc., for newspaper. All our outfits complete, ready for instant use.

Catalogue free by mail of presses, types for all languages, paper, cards, etc. Write to our factory near New York.

**KELSEY & CO., Meriden, Conn., U. S. A.**

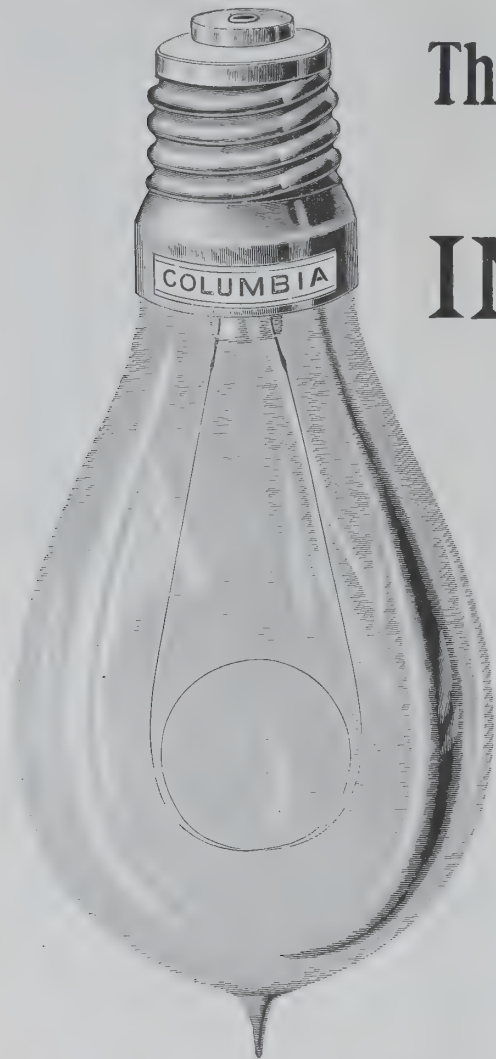


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# The Columbia Incandescent Lamp Co., ST. LOUIS, MO., U. S. A.

Manufacturers of Strictly High-Grade

## INCANDESCENT LAMPS



The above cut shows exact size of our regular Standard Lamp.

Our product surpasses all others in maintenance of candle power and uniformity in consumption of energy. Owing to the high maintenance of candle power we specially request users to order lamps up to the maximum voltage at which they are to be operated. As the lamps do not grow yellow with age, they should not be operated at an excessive voltage.

We manufacture in all voltages ranging from 45 to 145 and from 200 to 250 volts.

Write direct to factory for catalogue, price list and other information.

BRANCH OFFICES :

NEW YORK,

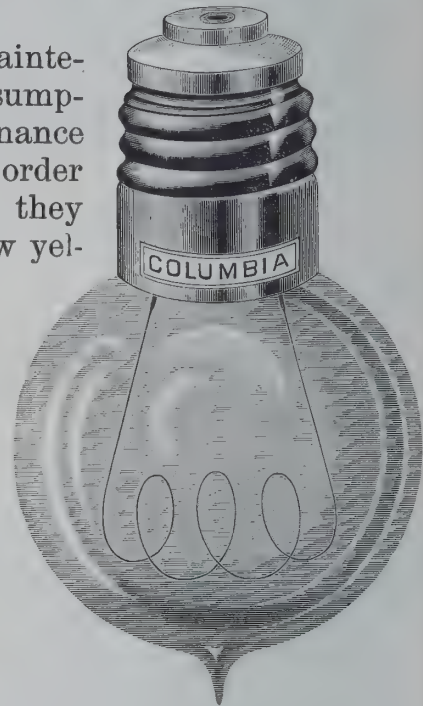
THE COLUMBIA INCANDESCENT LAMP CO.

Havemeyer Building.

SAN FRANCISCO:

PAUL SEILER ELECTRICAL WORKS.

Mention this paper.



The above cut shows exact size of our round Bulb Lamp for decorative lighting

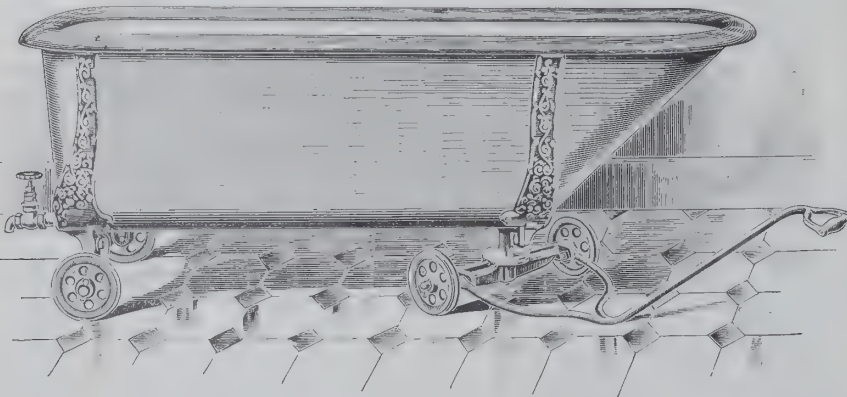
In correspondence with us relative to prices please state the candle power and voltage of lamps desired and the style of socket they are intended to fit.

## Steel-Cased Hospital Baths

### OUR IMPROVED "WARD" STEEL CASED HOSPITAL BATH.

These Baths are made with an outside Case of Sheet Steel, and an inside lining of Tinned Copper with ASBESTOS between the Copper and Steel.

The Steel Case is firmly riveted to the CAST IRON SUPPORTS, making the strongest and best constructed Tub on the market. The iron trucks are securely attached to the shell, and the wheels fitted with RUBBER TIRES. It can be turned in its own length. It has a handsomely finished Rim of Natural Oak or Cherry, and is painted outside in Light Gray and Bronze. No Hospital can afford to be without them.



Please note the following points in its favor:

**STRONG, LIGHT, WARM, HANDSOME, DURABLE, CHEAP.**

**DIMENSIONS:** Length outside Rim.....4½, 5, 5½ and 6 feet.  
Width outside Rim.....28 inches.  
Depth inside Rim.....17½ inches.  
Height from Floor.....28½ inches.

### PRICE LIST.

SIZE.	WEIGHT COPPER,	12 OZ.	14 OZ.	16 OZ.
4½ feet.....		\$26.00	\$28.00	\$30.00
5 ".....		28.00	30.00	32.00
5½ ".....		30.00	32.00	34.00
6 ".....		32.00	34.00	36.00

Securely Crated and delivered F. O. B.  
Liberal discount quoted on application.

## The Champion Water Heater.

SUITABLE FOR BATHS AND DOMESTIC PURPOSES.

Will heat sufficient water for bath in 10 minutes with one foot of gas per minute.

The most simple, efficient and economical Heater ever offered, and at the lowest price. The gas and products of combustion are entirely separate from the water, which is thus kept pure and sweet.

### LIST PRICE.

Copper, including shelf and brackets, \$25.00  
Nickel, " " " " 30.00

Boxing extra at cost.

Liberal Discounts quoted on application.



MANUFACTURED BY

# THE DAY-WARD CO., Warren, Ohio, U. S. A.

In ordering through export commission merchants, send us duplicate orders. Send for Catalogue.



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It is impartial because it treats all its patrons alike. It cannot, for this reason, and it does not, publish write-ups or puffs of any specific make of goods, no matter whether advertised in it or not. It charges the same price for the same services to all alike.

We desire it distinctly understood by those who contemplate advertising in THE AMERICAN EXPORTER that space for advertising purposes is sold only upon the merits of the publication for that purpose. For this reason no advertising solicitor or agency has any right or authority to agree to give reading notices or to perform any special service whatever to obtain orders for advertising.

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## THE JOHN C. COCHRAN CO.

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Bigelow, J. F.—Wire Fly Killers.....	25	Fort Wayne Electric Corporation—Electric Lighting Apparatus.....	41	Leffell, Jas. & Co.—Water Wheels and Steam Engines.....	6	Snell & Atherton—Shoe Tools.....	45
Biggs Boiler Co.—Boilers & Wheelbarrows.....	25	Franklin, T. W.—Rugs, Robes, etc.....	—	Leigh & Son, Evan—Commission Merchants.....	52	Snow Wire Works—Bicycle Holders and Wire Goods.....	43
Black Mfg. Co.—Bicycles.....	32	Gara, McGinley & Co.—Sheet Metal Cornices, etc.....	5	Lidgerwood Mfg. Co.—Hoisting Engines	23	Soudan Mfg. Co.—Bicycles.....	39
Bommer Bros.—Hinges.....	54	Georgia Car and Mfg. Co.—Railway Freight Cars.....	51	Litchfield Mfg. Co.—Feed Grinders...	29	Speare's Sons & Co., Alden—Fireproofing and Waterproof Paint.....	45
Bowdlear & Co., W. H.—Beeswax.....	53	German-American Machinery Co. Ltd.—Boot & Shoe Machinery, etc.....	25	Lo Forte & Leeds—Toys, Novelties, etc.	54	Sprague & Hathaway Co., Portraits and Frames.....	55
Bradford Belting Co.—Leather Belting	49	Globe Buffer Co.—Shoe Machinery.....	53	Logan, Swift & Brigham Envelope Co.	53	Stafford Co., E. H.—School & Office Supplies, etc.....	7
Breckenridge Co., The E. P.—Bicycle Lanterns.....	35	Gillie, Godard Co.—Steam Riding Gallery.....	54	Lovell Mfg. Co.—Mouse Traps, Wringers, etc.....	43	Stahl, Geo. H.—Incubators.....	54
Brockton & Eureka Box Toe Co.....	50	Gold Medal Camp Furniture Mfg. Co.—Folding Bath Tubs, etc.....	52	Ludlow Bros.—Hubs and Hub Blocks...	46	Standard Emery Wheel Co.—Emery and Corundum Wheels.....	—
Brown-Lewis Cycle Co.—Bicycles.....	37	Goodell Co.—Hand Seed Sower.....	50	Lunkenheimer Co., The—Valves, Injectors, etc.....	48	Standard Tool Co.—Twist Drills, etc.....	47
Brown & Co., B. F.—Shoe Dressing.....	5	Gould Packing Co.—Steam and Water Packing.....	45	Macey Co., Fred.—Desks.....	4	Star Drilling Machine Co.—Oil, Gas, Water and Well Drilling Machines...	15
Brown & Son, John I.—"Brown's Bronchial Troches".....	53	Grand Rapids School Furniture Co.....	21	Manson Cycle Co.—Bicycles.....	39	Steinmann, L. E.—Exporter.....	54
Buckeye Incubator Co.—Incubators and Brooders.....	54	Granger, J. C.—Gas Tubing.....	—	Marion Cycle Co.—Bicycles.....	32	Stieltjes & Co., F.—Importers.....	50
Buffalo Wheel Co.—Bicycles.....	37	Harrington & King Perforating Co.—Perforated Sheet Metals.....	21	Marseilles Mfg. Co.—Corn Shellers, Horse Powers, etc.....	26	St. Joseph Pump & Mfg. Co.....	5
Burckard Blacking & Oil Co.—Leather Dressings, Polishes, etc.....	25	Hartshorn Co., Stewart—Shade Rollers	2 & 50	Maryland Steel Co.—Steel Rails, Bridges Buildings, etc.....	23	Strange Forged Drill & Tool Co.—Forged Twist Drills.....	43
Campbell & Sons, Gardiner—Bells.....	54	Harvey & Watts Co.—Anti-Nicotine Pipes.....	54	Mayo & Bro., P. H.—Plug Tobacco.....	53	Strelinger Co., Chas. A.—Tools.....	16
Cardwell Mfg. Co.—Tobacco Machinery, Hydraulic Baling Presses, and Cotton Seed Oil Machinery.....	52	Hasker & Marcuse Mfg. Co.—Tin Boxes, Tobacco Tags, etc.....	51	McCray Refrigerator & Cold Storage Co.—Refrigerators.....	39	Stubbs' Mercantile Agency.....	5
Case Mfg. Co.—Mill Machinery.....	26	Hastings & McIntosh Truss Co.....	31	Meade & Baker Carbolic Mouth Wash Co.	54	Sturtevant Co., B. F.—Pressure Blowers	55
Chadwick Copying Book Co.....	46	Hauthaway, C. L. & Sons—Shoe Dressing.....	55	Merriam Co., G. & C.—Webster's International Dictionary.....	—	Sunbeam Incandescent Lamp Co.....	—
Challenge Machinery Co.—Printing Presses, Paper Cutters, etc.....	54	Hazelton Boiler Co.....	7	Milbradt & Co., G. A.—Rolling Step Ladders.....	50	Taber Pump Co.—Rotary Pumps.....	50
Chamberlin Mfg. Co.—Stump Pullers...	5	Heffermehl & Co.—Mercantile Inquiries	53	Miller Co., Frank—Blackings and Leather Dressings.....	39	Tarr, James H.—Copper Paint.....	21
Chandler & Taylor Co.—Steam Engines, Boilers and Saw Mills.....	47	Helvetia Milk Condensing Co.—Evaporated Cream.....	31	Moline Plow Co.—Plows, Harrows, Cultivators, etc.....	26	Temple Cycle Co., Ralph—Bicycles.....	37
Chapman Cream Separator Works, C. L.	51	Hill Brass Co., N. N.—Bicycle Bells...	35	Morris European and American Express Co.....	51	Thomson Mfg. Co., Judson L.—Rivets...	2
Chattanooga Foundry & Pipe Works—Cast Iron Pipe.....	50	Hill Mfg. Co., James—Fire Pails and Buckets, etc.....	31	Moss, Geo. A.—Shoe Dressing for Ladies and Children.....	49	Thomson Meter Co.—Water Meters...	56
Chicago Handle-Bar Co.—Bicycle Handle Bars.....	37	Hill Tool Co., Hugh—Tool Holders...	31	Munson Typewriter Co.....	50	Tubular Rivet & Stud Co.....	55
Clucas & Boddington Co.—Plants, Seeds and Bulbs.....	54	Hilliard, R. E.—Cut Soles.....	54	Nashua Saddlery Hardware Co.....	43	Tucker & Dorsey Mfg. Co.—Alarm Cash Tills.....	48
Coho & Co., H. B.—Electrical Supplies,	41	Hollenbeck & Co., F. A.—Bicycle Saddles	37	National Meter Co.—Water Meters...	19	Tudor Iron Works—Rails, Spikes, Bolts	51
Coie & Co., G. W.—"Three in One" Lubricant.....	35	Holmes & Edwards Silver Co.—Spoons and Forks.....	39	National Paint Works—Prepared Paints	25	Union Carving Machine Co.—Drop Carving Machines.....	16
Collins Plow Co.—Hay Presses, etc.....	29	Hough Cash Recorder Co.....	47	National Starch Mfg. Co.—Maizeana...	29	United States Playing Card Co.....	5
Columbia Incandescent Lamp Co.....	8	Howe Mfg. Co.—Envelopes.....	—	New Jersey Paint Works—Copper Paint, etc.....	7	Vilter Mfg. Co.—Corliss Engines, Refrigerating Machinery, etc.....	54
Cook, A. D.—Tube Well Supplies.....	52			New Process Twist Drill Co.....	43	Wagner Electric Mfg. Co.—Transformers	41
Crosby Steam Gage and Valve Co.—Safety and Water Valves.....	43			Nordyke & Marmon Co.—Flour and Corn Mill Machinery.....	15	Walmsley & Sons, Jas.—Leather Belting	23
Cuprigraph Co.—Sanitary Still.....	53			Ohio Electric Works—Electric Novelties.....	48	Waterloo Organ Co.—Parlor and Cabinet Organs.....	23



# THE AMERICAN EXPORTER

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## 1897, A REVIEW—THE OUTLOOK, 1898.

THE point of vital significance about the record-breaking export trade of 1897 is not the great increase in the total exports, nor the fine showing in our favor made by the figures about the "balance of trade" so dear to the heart of many editors. It is that the notable rate of progress in exports of manufactures begun during the hard times is being steadily maintained. The great exports of breadstuffs and the high prices obtained therefor are essentially temporary, due to extraordinary combinations of circumstances. The growth in exports of manufactures is steady, due to fundamental and fixed conditions, and is likely to be permanent.

The principal factors in the increase of American exports are the following:

1. The necessity of seeking a foreign market for the surplus of American manufactures remaining after the home market has been supplied, a surplus greater when domestic trade is dull, less when it is brisk, but increasing steadily all the time.

2. The skilled labor of America, untrammelled by tradition and free from foolish trade-union restrictions, capable of double and treble the daily output of the low-priced labor abroad.

3. Labor-saving machinery vastly lessening the cost of production while insuring an even and uniform quality of product.

4. Improved methods, saving handling and stopping waste, so marked a characteristic of American shops as to occasion the remark that while Europeans are masters of the art of domestic economy, Americans are masters of the art of industrial economy.

5. Special adaptability of American goods, particularly machinery, to the needs of foreign buyers, due to the fact that the industrial problems solved here are the same as those in most countries, especially the newer ones, and to the greater readiness of American

manufacturers and inventors to make modifications to suit particular local conditions.

6. The long campaign of pioneer work carried on by many intelligent manufacturers with a view to making the merits of American goods known abroad, a campaign now being conducted with even greater vigor and system than before.

7. The increasing impression abroad that "American" means not only the latest but the best in scores of lines, notably electrical supplies, labor-saving machinery, bicycles, typewriters, agricultural and mining machinery, and all kinds of "inventions."

Obviously all of these forces are steadily and increasingly active. They do not depend upon crops or seasons, or upon fluctuating circumstances of any sort. We are confident, therefore, that, while 1898 may show a falling off in the total exports owing to an almost inevitable decline in the volume of breadstuffs exported, the exports of manufactures will continue to increase. Indeed, in several lines the amount of contracts already placed renders this certain. In all lines the outlook is hopeful, and energetic manufacturers are exerting themselves to reap the fullest measure of advantage for their concerns from the very favorable situation.

## GROWTH OF EXPORTS OF AMERICAN MANUFACTURES.

NO facts regarding the export trade of the United States are more significant than those showing the relation subsisting between exports of manufactures and the total exports of domestic merchandise. For many years the world has regarded the United States as one of the chief sources of its food supply and of some of the more important of its raw materials. In the tables of European statisticians the United States has thus been grouped with Australia, India, Russia, Argentina, and so on. Properly speaking there should be no element of reproach in this. Vast areas of almost fabulously fertile soil and favorable climatic conditions, combined with an abundance of intelligent labor, an unparalleled use of labor-saving machinery and highly developed transportation facilities have given us an advantage in the production of cereals and meats that we should be very foolish to neglect, and in the benefit of which the whole world shares. None the less we are accustomed to regard the exportation of natural products as in a way characteristic of new and undeveloped countries and to associate manufactured products with a more advanced industrial development. These tables are, therefore particularly interesting as showing the steadiness and rapidity with which the United States is outgrowing the "raw material" classifications and becoming one of the world's chief sources of manufactured articles, many of them highly specialized as well.

### EXPORTS OF MANUFACTURES.

YEAR.	Value.	Total Exports.	Percentage of Total.
1860.....	\$40,345,892	\$316,242,423	12.76
1870.....	88,277,764	455,208,341	15.00
1880.....	102,856,011	823,946,353	12.48
1885.....	147,187,527	726,682,946	20.25
1890.....	151,102,376	845,293,825	17.87
1891.....	168,927,815	872,270,283	19.37
1892.....	158,510,937	1,015,732,011	15.61
1893.....	153,023,118	831,030,785	19.02
1894.....	183,728,808	869,204,937	21.14
1895.....	183,595,743	793,392,599	23.14
1896.....	228,371,178	882,519,229	26.48
1897.....	276,357,861	1,051,987,091	26.78

Coincident with this advance in the per cent. of the total exports belonging to the division of manufactured products there was a decline in the per cent. of agricultural products exported. While increasing in absolute amount from \$256,560,972 in 1860 to \$683,471,139 in 1897 they declined relatively from 81.13 per cent. of the whole in 1860 to 66.23 per cent. in 1897. The significance of this comparison is too obvious to escape attention. It does not mean that the importance of this country as an exporter of agricultural and mining products is on the decline, but that its importance as an exporter of manufactured products is increasing far more rapidly and bids fair in time to overshadow the rest.

There is something vague and unsatisfactory about such large totals, however, so our readers may gain a clearer idea of the amount



of progress made by noting the growth of exports in some representative manufactures.

The reports of the Bureau of Statistics are fairly complete as far back as 1860, but as the Civil War greatly reduced exports for the time, 1870 seems a fairer date to begin, even though the showing made may be somewhat less striking. The list below might be greatly increased, but the lines given are thought to be those of the most general interest. The figures tell their own story:

ARTICLE.	1870.	1880.	1885.	1890.	1897.	Increase. Per cent.
Agricultural implements .....	\$1,068,002	\$2,245,742	\$2,561,602	\$3,859,184	\$5,240,686	391
Builders' hardware .....	"	"	1,156,167	1,985,794	4,152,836	258
Saws and tools .....	310,021	958,000	1,108,474	1,865,603	2,474,630	698
Electrical supplies .....	"	"	449,587	1,429,785	3,054,453	579
General machinery .....	1,913,384	3,490,410	3,798,795	8,054,776	19,771,856	934
Jewelry .....	59,739	321,231	380,520	662,759	1,558,676	1,000
Paints and varnish .....	156,891	327,836	485,610	794,584	1,376,297	776
Cycles and parts .....	"	"	"	"	7,005,323	269+
Locomotives .....	341,949	466,313	732,403	1,280,606	3,225,831	843
Paper and manufactures of .....	515,536	1,183,140	972,493	1,226,686	3,333,163	547
Roots and shoes (leather) .....	419,612	441,069	598,151	662,974	1,708,224	307
Musical instruments .....	267,400	548,684	941,344	1,105,134	1,276,717	379
Steel rails .....	65,081	14,744	206,401	315,081	2,482,208	3,718
Clocks and watches .....	509,000	1,443,000	1,345,940	1,695,126	1,770,402	200
Cotton, manufactures of .....	3,787,282	9,981,418	11,896,591	9,999,277	21,037,678	482

\* Not classified separately.

† In one year. \$1,898,012 in 1896.

This splendid showing is not only a matter for satisfaction for the firms participating, and for all Americans, but for the rest of the world as well. Most of our readers are familiar with the famous *bon mot* of President Lincoln, "You can fool all of the people some of the time, and some of the people all of the time, but you can't fool all of the people all of the time." This is just as true in trade as in politics. The sale of inferior articles may flourish for a time but people are sure to find out the deception at last and refuse their patronage. If the sales of a firm go on steadily increasing year after year for a long term of years it is an infallible indication that they are giving satisfaction and that every customer made is kept. The same holds true of nations as well as of individuals, and the steadily expanding volume of trade in the various lines of American manufactures noted in the little table above, as well as in many lines that space would not permit us to include, show that buyers all over the world have found our manufacturers safe and satisfactory people to whom to send their orders.

### CHEAPNESS.

IT is often claimed for the English language that it is the most comprehensive and flexible in the world. This may be so. Certainly no language has borrowed more liberally from others. But, with all its richness, no language contains so many words with double and often diametrically opposed meanings. One of the worst examples of this is, unfortunately, a little word that must be used perpetually by business men.

Originally the word *cheap* had a singleness of meaning that was tolerably clear. Used with reference to price it meant either that the price was absolutely low, or that it was low when actual practical value was considered. Thus we say that pins which sell at retail at the absurdly low price of a cent for a paper containing from 100 to 250 are cheap, and we apply the same term with equal justice to a printing press costing thousands of dollars, but capable of doing immense quantities of work swiftly, neatly, evenly and at a trifling expense for attendance.

It was, we believe, our English cousins who got up the expression "cheap and nasty." Whether it was this phrase that gave the word *cheap* the bad meaning that it now undoubtedly possesses we cannot undertake to say, but certainly the idea that the two words are natural consorts has gained a wider acceptance in England than on this side of the water. Here, too, however, we note a growing suspicion of cheapness as an intrinsic quality taken by itself. Possibly this is due to an over-insistence upon this point by our dry-goods advertisers. The public has heard so much assertion that is obviously untrue that it naturally has become suspicious. The American is thus coming to associate cheap with shoddy just as the Englishman does with nasty. The politicians have gone even farther, and one of the most prominent of them has told the world that "a cheap coat means a cheap man."

This growing confusion of two absolutely contradictory ideas suggested by the same word is unfortunate. It is gradually spoiling a very good word. A little reflection will show that the attaching of a bad sense to the word *cheap* is wholly unjustifiable. Shoddy is not cheap—in the long run. A poorly designed and badly constructed printing press is not cheap at any price. These things are dear. That they have been falsely called cheap by unscrupulous dealers should not lead us to condemn the word.

Properly considered, the word *cheap* ought not to have a trace of presumptive reproach. Cheap must, of course, like any comparative term, refer to lower as well as higher grades of excellence. But if, in considering every grade, we add the proviso "quality considered" we shall get at the true value of our term. A bicycle for \$10 would then be cheap in the sense that the price was absolutely low, but when we add our qualifying proviso we should probably conclude that, "quality considered," it was not so cheap after all. But a bicycle at \$30 or \$50 might well be cheap even though judged by the most exacting standards of quality. In machinery first cost is not so important a consideration as running cost, labor-displacing capacity, durability, rapidity and evenness of action, liability to repairs, etc., taken together. It is only by considering all of these factors in the problem that the manager or purchasing agent of a mill, mine or commission house can determine whether a given equipment, designed to be effective and up-to-date for a term of years, is really cheap or the reverse.

Intelligent men are not likely to be deceived by the confusion arising from the false meaning grafted upon the word *cheap* in the manner we have described. They will readily distinguish the reality from the sham, and not condemn the former because of the frauds committed in its name. Honest cheapness as applied to manufactured products carries with it a presumption of excellence, of careful study of conditions, of elaborate preparation of agencies, of existing supervision of operation, of persistent insistence upon satisfying high standards. The manufacturer who uses the term rightfully is a benefactor. He has produced something at a lower cost, quality considered, to the consumer, or offers something of greater value at the same cost than was ever produced before. It is unfortunate that some such laws as those passed in many countries restraining dealers from calling oleomargarine "butter," or brass watches thinly plated "18-karat solid gold," cannot be passed restraining frauds from using the vocabulary of honest men in describing their worthless goods. But, because they do, let us not blame the vocabulary. Cheap is a good word and cheapness is a good quality. We cannot have too much of both—"quality considered."

### THE END OF THE ENGINEERING STRIKE.

THE announcement that the beginning of the present month sees the close of the long and disastrous strike of the English machinists or engineers will be welcomed even among those who have been benefited temporarily by its continuance. We on this side of the Atlantic are rivals of Great Britain, but we are not enemies, and the destructive industrial war just closed has been viewed over here with the keenest concern. The issues in the great dispute are of universal importance, and we cannot but feel that the outcome is a matter for general congratulation throughout the commercial world.

With the demand of the workmen for an eight-hour day we have a good deal of sympathy. One of the oldest shibboleths of modern labor is expressed in the doggerel lines:

"Eight hours' work and eight hours' play,  
Eight hours' sleep and eight bob a day."

The time may come when this not extravagant ideal may be realized, although with the present keenness of international competition it is doubtful if it could safely be inaugurated in all trades at once. The serious point about shorter hour agitations is that they never reach finality. Every argument used to prove that an eight-hour day is better than nine might be employed to prove that seven hours is better than eight. No one can question the gain to the



community in the victories of labor that reduced the number of legal working hours to ten in many countries. But there must be some point between ten and zero where the reduction of the period of industry must stop. But, in the present instance, had the eight-hour day been the only point in controversy doubtless some compromise regarding overtime could have been discovered.

But another issue was injected into the discussion, and by the manufacturers themselves, that overshadowed in importance the eight-hour day and all other considerations whatsoever. This issue was trade-unionism. The masters did not aim to destroy the trade-unions, but they insisted that they and not the professional labor agitators controlling the unions must be allowed to run their own shops. It has been difficult for Americans to appreciate the extent and variety of trade-union tyranny. We have "walking delegates" over here, but they are as infants in arms compared to their cousins over sea. Trade-union interference has been carried into every detail of the manufacturer's business, even to the extent of dictating to him regarding the treatment of his customers. A Canadian paper now before us relates a case in which a Montreal commission merchant asked for an allowance on some brass goods that had been damaged in transit. He was informed that while the makers personally were willing to make an allowance the rules of the Brass-workers' Union, or whatever the body in question was called, prevented them from making any allowance off the face value of the invoice, no matter what the circumstances might be. Naturally this commission merchant sent his next order to the United States. It is strange that the men themselves could not understand that this must be the inevitable result of such a policy.

But the greatest evil of English trade-unionism has been its attitude toward machinery and its curious notions as to what constitutes an honest day's work. Mr. Hiram S. Maxim, the celebrated gunmaker, has pointed out very clearly the fallacy of trade-unionists that accounts for their otherwise unintelligible performances in this direction. "It appears to the clouded intellect of the unionist," says Mr. Maxim, "that there is a certain amount of work to be done anyway, and that this quantity is fixed. Consequently he looks upon work as something that ought to be nursed and made to go as far as possible. It never occurs to him that if this were carried to extremes in either direction the whole thing would be changed. For instance, if the cost of mechanical work should be increased 25 per cent. in England the greater part of it would be driven into foreign countries, whereas, if it could be produced in England for 25 per cent. less than in other countries there would be more than enough work for every one who could be employed."

It has been in the logical application of the foregoing theory that the trade-union authorities have systematically opposed the introduction of all new machinery, and whenever it has been introduced in spite of them have sought in every way to lessen its effectiveness. Mr. Maxim tells how he found the milling on his guns uniformly bad—everything was a great deal too large—in order, as he afterwards learned, that the fitters who were to file the work down to size might have enough to do. When the milling was properly done it was found that the fitters did twenty times as much work as formerly. In another case some high-priced but exceedingly effective American machinery had been introduced. It was found that the output remained the same as with the cheap machines. Mr. Maxim himself demonstrated to his workmen that by taking advantage of the various stops and appliances for duplicating work they could turn out from six to ten times as much as they had been doing. In vain. Nor was this due to negligence or stupidity. The union had remonstrated with the men and cautioned them against doing so much work. "If Maxim wants more work done why does he not get more men?"

This perverse ingenuity of the English trade-union engineers has been carried to a point that has reduced their labor almost to "organized idleness." Machines are run at the lowest possible speed, given the smallest possible cut, and a hundred ways have been discovered of cheating the employer. One of the fundamental rules of the union has been that no man should be allowed to run

more than a single machine. Both in America and on the Continent workmen run habitually from four to as high as a dozen machines. Obviously it is not worth while for the English manufacturer to purchase labor-saving machinery at all if he is to be systematically deprived of all possible advantage from its use. Another pet theory of the unions is that only by serving a formal apprenticeship can a man become a "skilled" laborer, and that only skilled laborers should be permitted to handle large and complicated machines. This again defeats the very object for which expensive automatic devices were added to such machinery. Piece work is another bugbear to the English labor agitator.

The spirit of British trade-unionism is one of solidarity that, however admirable in itself and however useful when exerted in behalf of laudable reforms, cannot but be condemned when aimed at the progress of invention and in behalf of socialistic efforts to reduce all labor to the level of the laziest and the most incompetent. It is the grasping spirit of the unions that has brought about their downfall in the recent conflict. It has been with their demands as with the Hollanders of the time of Hudibras:

"In matters of commerce the fault of the Dutch  
Is giving too little and asking too much."

The victory of the masters must be hailed everywhere as a stinging blow at a very pernicious, intolerable and growing evil. Undoubtedly one of its immediate effects will be the rapid equipment of English shops with the most approved labor-saving machinery and the adoption of the most effective and modern methods. The result of this of course will be ultimately that the English manufacturer will become a more dangerous rival than ever in international trade. But neither German, French nor American manufacturers will begrudge them their share in the world's orders in view of the notable victory they have gained in behalf of progressive methods in manufacture everywhere.

#### THE EFFECT OF MODERN COLONIAL EXPANSION UPON COMMERCE.

ONE of the most important aspects of the history of the last 400 years, and one too little studied and discussed, is the notable progress of colonial activity that began immediately upon the verification of the news that a new continent had been discovered by Columbus and has continued without interruption ever since. No field of human history is more interesting or more instructive than that presented in the records of these various colonies, the circumstances that determined the character of their European conquerors, the early vicissitudes, the hardships and bravery of the first struggling settlers, the wars, frequently between rival European States, that determined their final ownership, and their subsequent, often amazingly, rapid development, with the causes political and economic that lead thereto.

A careful study of this history would reveal the fact that certain nations are manifestly adapted to succeed in colonizing operations, while others have, after a trial of 400 years either achieved only a most indifferent degree of success or have failed altogether. It would, furthermore, become evident that certain nations have so developed their colonies, and so favored a broad and equitable treatment of other nations in their commerce with them that the possession of such colonies by them has been a source of benefit to all the world. Other nations, on the contrary, actuated by narrower motives, have so circumscribed and thwarted the natural development of their dependencies and so checked and hampered their commerce with a mistaken idea that by so doing they were benefiting themselves, that the occupation of fresh territory by them can be regarded as little less than a universal calamity, without adequate compensating advantage even to themselves.

In general, however, subject to these limitations, we may regard colonization as desirable and praiseworthy. When a civilized nation acquires by purchase or treaty a large tract of territory over which the original inhabitants have merely roamed for centuries without attempting to utilize its natural capacities at all the result



is a distinct addition to the resources of the human race. The possession of vast tracts of territory by savage tribes means that so much of the world's surface must be blotted out of all economic and commercial estimates. The region may be enormously rich in every form of natural wealth, it may possess untold capacities awaiting only intelligent development. But to the eye of the merchant it is as a desert. The moment that it becomes a colony governed and protected by a civilized power all this is changed. By an intelligent and systematic development of its resources the products of such a colony immediately become a factor in the commerce of mankind and industries in a score of countries may be enabled to produce more cheaply and effectively because these products have been made available.

At first a new colony naturally confines itself to the production of the peculiar commodities indigenous to that locality or climate. These are usually raw materials. Later, if the exploitation of the resources of the colony is intelligently conducted, special capacities or adaptabilities are discovered. It may appear upon experiment, for example, that the colony can raise wheat to advantage, or cotton. Mineral deposits may be discovered and industries based on the cheapness and proximity of such raw materials may be established. Thus far the colony has been increasingly an exporter of raw materials and an importer of all sorts of manufactured products, especially those adapted to a growing country, such as railway supplies, mining and agricultural machinery, and so on. The last step is the diversification of industries. Manufactures of all kinds spring up and commerce with this colony presents all the variety of commerce between the older nations of the world.

Such a progress as this that we have been describing step by step is a distinct enlargement of the bounds of civilization. The entire commercial world is benefited by it. But obviously such a growth would be impossible under artificial restrictions. The colonial mine owner must be free to buy the best mining machinery in the world and in the cheapest market. The colonial farmer must not be forced to use inferior tools at an exorbitant price that somebody in the mother country may grow rich at his expense. The best interests of the mother country demand that the colony should become rich and powerful, not that it should be cramped and starved.

The history of every colony since the time of Cicero and Verres is against a policy of exploitation for the selfish aggrandizement of the mother country and the friends of those in power. We are not speaking now of the coarser vices of extortion, plunder and rapine. The nations that have been guilty of these destroyed their foreign dominion by their own hands. We refer to the more subtle method of imposing trade regulations framed solely in the interest of the home market. The effect of such a policy, though nominally and superficially in the interest of the mother country, has uniformly proved hostile to the best interests of the nations that have adopted it as well as fatal to their colonies. It is at best but a relic of the commercial principles of the eighteenth century and the world has outgrown it.

There are now no more savage worlds to conquer. The forces of civilization, after playing around the borders of Africa for centuries, have at last rolled over it. The entire surface of the earth is either directly ruled over by some civilized power, or the existing government is under the well-recognized protection of such a power, or is maintained by the mutual distrust and jealousies of several powers. Some of the nations engaged in this nineteenth-century colonizing movement have engaged in similar operations since the time of Columbus, and their present policy is the outgrowth of centuries of experience and progress. Others are comparatively new at such undertakings, and have, so to speak, their record still to make.

The commercial world will watch with unflagging interest the development of the colonial policy of the great colonizing nations. All have an equal right to profit by the lessons of the past, and have the advantage in their present undertakings of the greater civilization of to-day. Cruelty that would not have been remarked

in the seventeenth century would disgrace this. Commercial policies that would have been praised in the eighteenth century would be ridiculed now. The world is ready to welcome all colonial expansion, by whatever nation undertaken, but only on condition that it be directed by a spirit of justice, of progress and of a reasonable commercial liberty. Nations who are not prepared to pursue an enlightened policy with regard to their dependencies will lose nothing and harm no one by handing the territories they have acquired back to the savages.

#### THE ATTITUDE OF AMERICA TOWARDS THE PARTITION OF CHINA.

THE somewhat theatrical occupation of Kiao Chou by the Germans and the far quieter but possibly more portentous occupation of Port Arthur by Russia, together with the seizure of the Island of Hainan by France, are exciting the liveliest interest throughout the commercial world. The movements of modern diplomacy are so veiled and mysterious that at the present writing no one can say what the outcome of these incidents will be. Some assert that the partition of the Celestial Empire has been agreed upon and is now being actually consummated, others that the total result will prove to be merely a coaling station or two, with possibly increased "spheres of influence," for the Powers most actively concerned. It is probable that the balance of opposed interests will prove to be so even that the more moderate prophesy will be nearer the truth. Great as the commercial possibilities of China are, the whole empire would not be a prize sufficient to compensate the losses of a single State in a general European war.

But while we are not inclined to consider the situation in the far East as an alarming one at present, it cannot be denied that it raises some very serious and far-reaching problems and is calculated to excite the gravest apprehensions. In the great diplomatic struggle being waged at present Russia, Germany and France appear to be committed to a policy of territorial expansion at the expense of China, and an incidental, but deliberate, disturbance of the trade relations heretofore existing between China and the rest of the world. England and Japan, on the other hand, stand for the principle of fair trade and equal rights, insisting that whatever concessions are made to one must be made to all. With the issue thus clearly drawn it is not only interesting but important that the attitude of the United States be both clearly defined and distinctly understood.

That the interests of the United States are sufficiently important to justify such an expression of her position no one can question. England has always held the first place in the foreign trade of China, Japan holds the second, the United States the third. Our imports from China and Hong Kong together have averaged \$20,000,000 a year for the past fifteen years, and during the last five years the totals have averaged more than \$21,000,000. Our exports to China have been considerably less, but have, on the other hand, been increasing more rapidly. During the ten years from 1883 to 1892 they averaged about \$9,500,000, and during the last five years about \$11,000,000. The total for the fiscal year just closed, however, was \$18,000,000, the largest on record. More than this, our markets in China appear to be on the eve of a very notable expansion along a number of important lines. Wheat flour, for example, of which an insignificant quantity only used to appear in the annual returns, figures among our exports to Hong Kong in 1897 for \$3,322,241. For years the value of manufactures of iron and steel sent by us to China rarely exceeded \$75,000. Last year the value of locomotive engines alone exported was \$138,140 and of miscellaneous machinery \$80,553.

We cannot be expected to allow this growing trade to be placed in jeopardy or destroyed without a protest. We can have neither interest nor sympathy in an effort to force commerce by the sword. We must stand for commerce through peace. A programme that involves the taxing of commerce for military establishments and expeditions, the exclusion of trade competition from all points



directly occupied or controlled, the enforcement of preferential tariffs as a means of forcing the goods of the favored nations into the rest of the country, the encouragement of railroad privileges under which the traders of the invading powers will enjoy special advantages, and the practical, if not openly avowed, destruction of the treaty rights of competing nations is one calculated to inspire universal alarm and arouse wide-spread resistance.

The United States will welcome all efforts to throw the Celestial Empire open to foreign nations more generally than is now the case and thus bring its vast natural resources and teeming labor into the service of the more modern and progressive civilization of the West. In the competition that must ensue between the great producing nations of the world we are willing to take our chances in a fair field with no favors. But the entire weight of our moral support, with all that that implies, must be thrown against those whose policy aims at a selfish exploitation of this ancient empire as if it were a conquered province and in behalf of those who are acting not only for themselves but for the whole commercial world. The traditional foreign policy of this republic has ever been a peaceful one, but European nations will do well to consider in their estimates the tremendous importance of the support of a free people with the wealth and resources of this. Passively exerted it would mean at least unlimited credit for those who had made our cause their own.

#### INTERNATIONAL EXPOSITIONS AND FOREIGN TRADE.

WHEN means of transportation were imperfect it was easier to bring the buyer to the merchandise than to carry the manufactured articles to the buyer, and thus fairs originated where the producer could find congregated in one place a number of persons who either came to lay in needed supplies or who might be induced to buy some of the things offered. Usually these fairs were held upon some saint's day or at the time of a church festival when a large concourse of people was brought together. At first the coming of the people was due to a desire to participate in the religious observances, then when merchants sought to profit by these gatherings the festival was prolonged, until finally the primal idea was lost sight of altogether and industrial fairs as we know them to-day were inaugurated.

In these fairs the sole purpose at first was to bring buyer and seller together. Nothing was exhibited with any higher motive in view, and the best result which superior quality could bring to a producer beyond immediate profits was the hope that in subsequent years he might enjoy continued patronage. The purchased goods made but short journeys to reach the homes of the new owners, and even if others should look with approval upon these samples of skillful manufacture they would patiently wait until the next fair should take them to the stall or booth where the coveted articles could be found. Consequently but little trade was created in this way—old wants were supplied without generating new ones. This was true at the great fair of Beaucaire, in France, which was frequently attended by 200,000 people and where sales amounting to \$5,000,000 were made. The renowned fair at Nijni-Novgorod is still conducted on a large scale and an immense volume of goods is sold. Here we see a gradual transition from the older type of bazaars to a new form in which the local character is being eliminated and a more cosmopolitan one assumed. The products of the land are offered for sale and the buyers come from far and near, but the visitor will find also articles from other countries, and producers who seek a Russian market place on view articles to tempt the dealer as well as the consumer. In later years the facility with which the buyer and seller can travel to meet each other renders unnecessary the holding of fairs and local trade prospers without their aid. Instead of manufacturing articles throughout the greater part of the year with the expectation of selling all within a few days, the producers strive to keep up a steady continuity of making and selling, and to stimulate sales he exploits his business along every available avenue.

One of the arguments made in favor of the organization of the

first international exposition, that of London in 1851, was that the nations of the world would meet in friendly rivalry to exhibit the products of their skill and ingenuity to the end that the buyers might select the best and the sellers find their most promising markets. This idea was kept in mind at the expositions at New York and Dublin in 1853, Paris 1855, London 1862, Paris 1867 and Vienna 1873. Experience showed that these expectations had been met and foreign trade greatly stimulated. Up to this time the commercial aspect alone was in mind, but when the proposition was made to celebrate some great event or anniversary by the holding of an exposition the spectacular feature came forward and many objects were exhibited because of their age, rarity or oddity. This type of exhibition began with the Centennial Exhibition at Philadelphia in 1876, and each successor has striven to outshine all that have gone before in the way of side shows and special attractions, until it is necessary to advertise the sort of "Midway" that is promised as well as the character of the displays expected.

The Philadelphia exhibition, that at Paris in 1889, and many others, have had for their chief aim, aside from the general commercial interest attaching to all great shows, such a spectacular illustration of the progress made in their respective countries during the preceding century. The Chicago exhibition and the coming Pan-American exposition at Niagara have a far wider interest and significance, embracing the continents of North and South America in their historical and commemorative features. That at Paris in 1900 will be world-wide, representing as it will the progress made throughout the world in every field of human effort during the most eventful century of industrial and scientific progress the world has ever known.

To these great assemblages each nation should come in a cordial and sympathetic spirit. Each becomes by virtue of its own exhibition the teacher of all the rest. Each, as regards the exhibitions of others, will be the pupil of all. None is so advanced that it has nothing to learn, none so selfish as to have nothing to impart.

The importance of these great modern fairs to international commerce is very great. With our present means of communication and transportation, and above all of swift and elaborate information, the entire civilized world can be present at these expositions, if not in person at least by proxy through trained reporters and artists. Not only can the makers and sellers of particular products reach enormous masses of buyers through the medium of such gatherings, but buyers in turn can learn to their advantage of new products and improved methods of which they might otherwise have long remained in ignorance. The opportunities afforded for comparison between the products of different nations is also of the utmost value to intelligent buyers. It frequently happens that export orders are sent to one nation because of some fancied superiority or because of a reputation gained in the very distant past when other nations have long since been making the same articles both better and more cheaply. Buyers as well as sellers have much to gain by attendance or intelligent representation at international expositions, and, within proper limits, such exhibitions are powerful promoters of foreign trade to the advantage of all concerned.

IT is with sincere regret that we learn of the death, at Miami, Florida, February 5th, of Joseph P. Smith, the director of the Bureau of American Republics. Although we have been well-known opponents of certain features of the policy of this Bureau, features introduced by the predecessors of Mr. Smith, we have always had the highest respect for the ability of the late director and for the energy with which he undertook and carried on the work entrusted to him by the President. Mr. Smith had been in public life for several years and was widely and favorably known throughout his native State, Ohio, and the adjoining States. He was 41 years of age, and it is reported that overwork occasioned by the rapid preparation of the Commercial Directory of the American Republics broke down his health. His premature death removes a very able and conscientious public officer and an ardent friend of American foreign trade.



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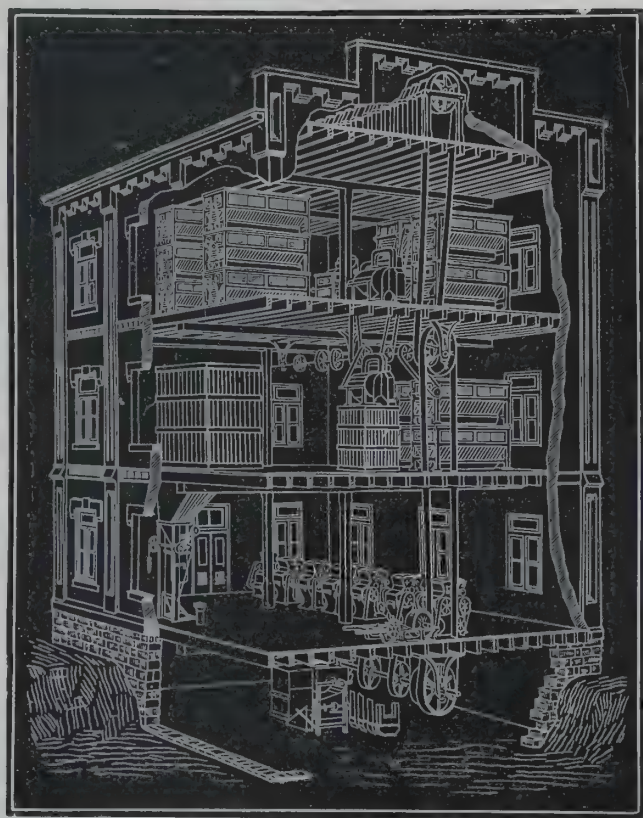
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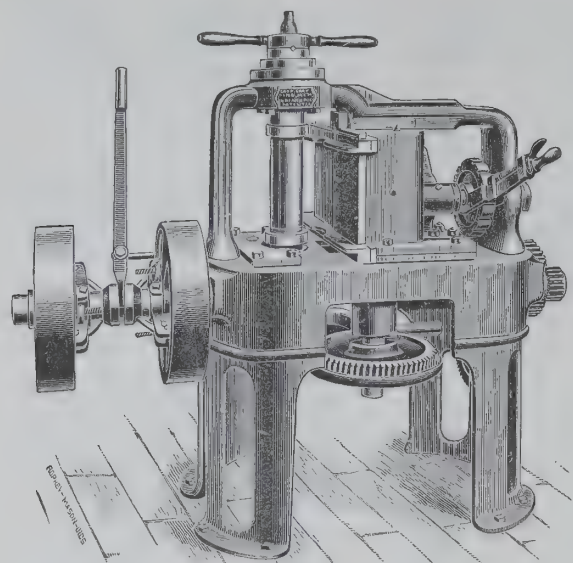
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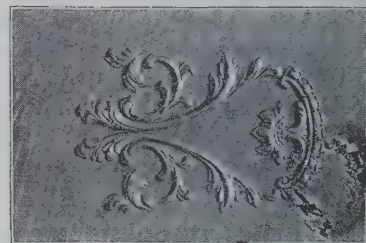
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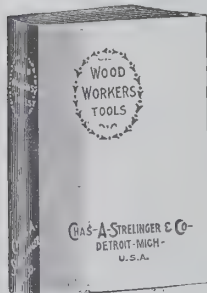
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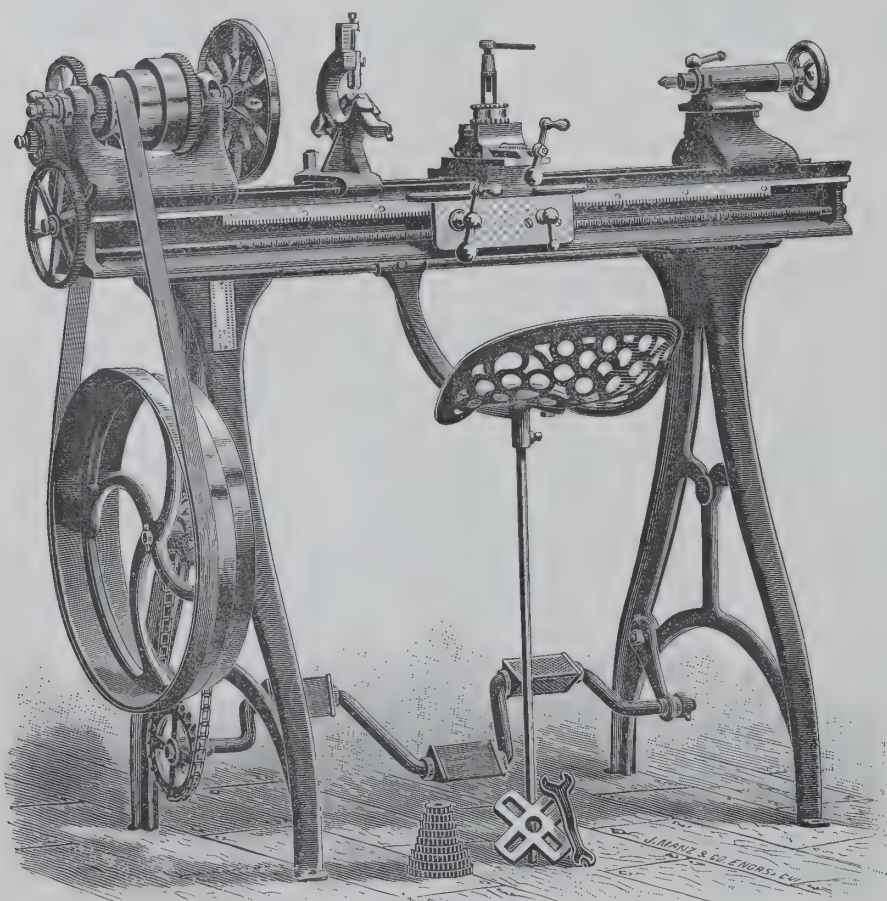
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### Convention of the National Association of Manufacturers.

THE National Association of Manufacturers of the United States held its third annual convention in New York January 26th to 28th. Both in attendance, in the importance of subjects discussed and the prominence of its speakers it proved to be the most successful convention in the history of the organization. The President of the Association, Mr. Theodore C. Search, gave a very able and exhaustive report in which he dwelt at great length upon the growing importance of the foreign trade of the United States. Among other matters he favored the speedy completion of the Nicaragua Canal, the effort to increase the foreign commerce of the United States by means of reciprocity treaties, radical reform in American consular service, the establishment of an international bank and the compulsory introduction of the metric system.

During the discussion of the report that followed, all of President Search's points were indorsed or referred to committees for future consideration. Among the resolutions reported by the Committee on Resolutions the following will be of the greatest interest abroad :

#### TO PREVENT IMITATIONS.

WHEREAS, It has become a well-known fact that manufacturers in some foreign countries are manufacturing goods which are imitations of American goods, and are exporting and selling them in other countries as American goods, using the trademarks and names of American manufacturers ; and,

WHEREAS, Some of the foreign countries permit the importation of goods without requiring them to be branded with country of origin ; and,

WHEREAS, The reputation of American products and the trade of American manufacturers are greatly injured by the manufacturing and sale of such goods ; and,

WHEREAS, Such practice on the part of the manufacturers of such goods, and their sale as American-made goods, is a fraud and imposition upon the people buying them ; therefore, be it

*Resolved*, That the National Association of Manufacturers respectfully invites the attention of the President of the United States and Congress to this subject, to induce all other countries to enact and enforce laws prohibiting the importation and sale of all goods that are not branded with the country of origin, similar to those now in force in this country and in the United Kingdom, with the view of taking such action as will provide a remedy for the evil referred to.

#### SOUTH AMERICAN TRADE.

WHEREAS, It is of the utmost importance to the manufacturers of the United States that every effort be made to increase our export trade to the south of us ;

*Resolved*, That we heartily indorse every effort that may be made to facilitate and increase our trade relations with those countries ; and be it further

*Resolved*, That we are unanimously in favor of the establishment of the proposed International American Bank, a bill to incorporate which is now before Congress (S. 753), and do most urgently commend it to our Senators and Representatives in Congress and would impress upon them the prompt passage of the bill ; and be it further

#### AMERICAN STEAMSHIP LINES.

*Resolved*, That the National Association of Manufacturers of the United States recognizes as a prime condition precedent to the prosperity of its industrial interests a reliable, efficient and economic system of transportation to foreign countries, and recommends the establishment of American lines of steamships wherever American manufacturers seek to sell their wares, urgently petitioning the Government of the United States to provide for the encouragement and maintenance of such service by a liberal system of contracts for the transportation of mail, or by such other form of subvention as may be necessary to support efficient service.

The culminating event of the convention was the grand banquet held at the Waldorf-Astoria Hotel Thursday night. Over 1,000 guests partook of one of the most elaborate menus ever served to such a large assemblage in America. Some of the points made by the eloquent speakers will be of interest to our readers. President Search, responding to the toast, "The American Manufacturer," said among other things :

We look with envy upon Great Britain's exports of \$330,000,000 worth of cotton goods per annum, beside which our foreign business of less than \$20,000,000 seems to sink into insignificance. We note that Great Britain has 45,000,000 cotton spindles, while ours number only 17,000,000, and we feel that we are far behind our greatest rival.

It does not always occur to us, however, that while Great Britain's cotton

mill equipment is about  $2\frac{2}{3}$  times as great as ours, the product of our cotton mills is more than three-fourths as large as the total output of the British mills.

From a much smaller equipment we produce an output that is rapidly approaching the point at which Great Britain's industry has long remained stationary. Fifty years ago 25 per cent. of all the cotton goods used in the United States was of foreign production, while now we make at home more than nine-tenths of all the manufactures of cotton we use.

The growth of the woollen industry has been even more remarkable, in spite of obstructing influences which hardly any other industry has been called upon to meet. Fifty years ago our product of \$50,000,000 worth of woollen goods represented about four-fifths of our consumption ; but to day, with close upon \$400,000,000 worth of domestic manufactures of wool, we have control of more than nine-tenths of our market.

Great Britain's supremacy in the manufacture of iron and steel was long thought to be secure for all time, but within the last five years we have not only come up alongside of Great Britain, but have passed beyond, and now lead the world in the production of iron and steel in nearly every form. We are no longer buyers from foreign rivals, but are large sellers to them. The current of this trade has been completely reversed, and our exports are three-fold greater than our imports.

No labor in the world is so well paid as American labor, and nowhere in the world has the element of labor in the total cost of production been reduced to so low a point as in several of our great industries. We learned long ago that machines worked more cheaply than men and yielded a larger return for the wages we pay them. With higher wages, with higher interest charges, with higher cost for most of our materials, we still, in many lines, are able to meet our competitors who once held us tightly in their control.

The speech of Mr. McKinley, President of the United States, who was the guest of the evening, has already been so widely reported that a brief extract from a less frequently quoted portion will suffice :

National policies can encourage industry and commerce, but it remains for the people to project and carry them on. If these policies stimulate industrial development and energy, the people can be safely trusted to do the rest. The Government, however, is restricted in its power to promote industry. It can aid commerce, but not create it. It can widen and deepen its rivers, improve its harbors and develop its great national waterways, but the ships to sail and the traffic to carry the people must supply. The Government can raise revenues by taxation in such a way as will discriminate in favor of domestic enterprises, but it cannot establish them. It can make commercial treaties, opening to our manufacturers and agriculturists the ports of other nations. It can enter into reciprocal arrangements to exchange our products with those of other countries. It can aid our merchant marine by encouraging our people to build ships of commerce. It can assist in every lawful manner private enterprise to unite the two oceans with a great canal. It can do all these things, and ought to do them ; but with all this accomplished the result will still be ineffectual unless supplemented by the energy, enterprise and industry of the people. It is they who must build and operate the factories, furnish the ships and cargoes for the canal and the rivers and the seas. It is they who must find the consumers and obtain trade by going forth to win it.

It is our duty to make American enterprise and industrial ambition, as well as achievement, terms of respect and praise not only at home, but among the family of nations the world over.

### Iron and Steel Export Orders.

AN offer for bids on 8,000 tons of rails was made on behalf of the Indian Railroad some time ago, and the bid of the Maryland Steel Company being more advantageous to the purchaser than the propositions of the British manufacturers, it was accepted. The Maryland company has an agency in London, and it was through this that the negotiations were conducted. The same company now has steel rails on the way to Sidney, Australia, the order being for 2,000 tons. It has also shipped rails lately to South Africa, and has taken an order to send 8,000 tons to Mexico. The Illinois Steel Company has been sending 20,000 tons of rails to Japan, these being shipped overland to Seattle, and thence by steamer. The Carnegie Steel Company has also taken orders for rails to be filled in Japan and China. Perhaps an even more striking feature of the American steel rail export trade is the fact that the Maryland company very recently received an order from England for 1,000 tons.

Exports to Japan and China from this coast embrace large lots of machinery and railroad material. Some time ago the Joliet Steel Company closed a contract for 26,000 tons of iron and steel for shipment to the Orient by Pacific Coast steamers. This freight has been going forward in liberal quantities for several months. While these consignments of Eastern produce and manufactured goods are contributing to make up the cargoes of these outgoing steamers, the Pacific States are reaping not a little benefit in augmented demand for their products in the form of flour, salmon and general produce. A considerable line of salted salmon has been secured for Japan, and it is thought that a large consumption in that line may be created. This new outlet for salmon will be much appreciated, as the product has been in excess of the demand.



### The Value of Specialization.

IT is frequently asked, "Why has American machinery, during the past few years, been found so superior to that of other countries?" In answer to this query the S. A. Woods Machine Company, of South Boston, says:

"Undoubtedly the most correct reply to this question will be a simple answer to the effect that Americans specialize. While it is found in foreign countries that a leading manufacturer in some particular line is in a position to furnish everything from engine and boiler to the smallest tool in the establishment and all of his own-manufacture, it is almost an impossibility to find this same state of affairs in connection with American manufacturers. To day, it is most natural to expect, in this country, to find some machine of a most superior character, as relating to its mechanical construction and labor-saving features, to be the only tool or machine built by its makers, who thus have opportunity to confine their whole attention and devote their whole energy to the perfection of their machine. Is it to be wondered at, therefore, that those who have a few novelties or specialties to devote their attention to can show such superior results by the machines they produce to those of the manufacturer who has to divide his attention among from twenty-five to fifty different kinds of machinery, the style and nature of which, while adapted, perhaps, for working the same material, be it metal or wood, are yet of a varied nature as relating to the work for which they are individually built?

"In no line is this contrast more prominent than in connection with the manufacture of wood working machinery, which has to be operated at high speed in order to accomplish the most satisfactory results. There are all classes of machinery built and offered for sale, so that it behooves the foreign purchaser to investigate oftentimes the grade or quality of the machine that is offered him. The distance from source of repairs furnishes sufficient reason for care in this direction, as broken-down machinery is not only expensive in itself by reason of cost of repairs, but more particularly so from the expenses entailed by the delay, awaiting receipt of new parts with which to repair the damages. Notwithstanding this there is, without doubt, no country in the world that produces so much strictly first-class machinery of all classes as America; and, to revert to our first explanation of this fact, we repeat the reason before stated, and add that 'to specialize is to perfect.'"

### American Axes and Saws in Australasia.

TWENTY years ago the ordinary splitter, bushman or selector, if asked, "What make of axes or saws do you prefer?" would unhesitatingly have answered, "English, of course; there's nothing like 'em." But to-day 90 per cent. of the answers would be—"American." The change has come about partly because of the superior enterprise of the Americans; partly because the conditions of life and work in the States more nearly approximate to those of these colonies. But a new force has made itself felt of late. In all kinds of work in which strong, willing workers are working side by side, and particularly when the payment is by results, there is always a rivalry, and the result is that one man tries his skill and endurance against another, either for a specified task or for a week's or a day's work. As far back as twenty-five years ago such trials of skill took place from time to time. Naturally each man had his axe or saw in as good order as possible, so that the maximum amount of result could be obtained from the minimum expenditure of elbow grease, and many experiments were made. Only fifteen years ago the well-known Spear & Jackson peg-tooth saws were the favorites for log-cutting in the bush, but the result of these trials was to set men's minds working, and new methods of grinding and shaping the axes or of sharpening the saws were resorted to with at first but little result. Eight years ago, at the instance of Mr. H. A. Nichols, of Tasmania, the United Australasian Axemen's Association was formed, and instead of private trials of skill public exhibitions were organized, with prizes offered, the seventh grand carnival being held in Melbourne recently. In addition to the carnivals the committee of the association have held meetings from time to time and discussed the make and shape of axes, saws, etc., and these meetings, combined with trials of various makes, shapes, etc., have ended in a complete revolution, and the axes and saws now used, especially in Tasmania, with which the greatest speed can be attained are very different in shape from the old English patterns. The results of these meetings, with drawings of the axes and saws, have from time to time appeared in this journal. In addition to this the secretary of the association has at various times communicated with both English and American firms and mark the result. Of letters sent to over twenty English firms some few years back only two brought replies, one a bare acknowledgment, and the other a half hearted attempt to adopt one of the suggestions in the letter, but the Americans at once grasped the situation, and

several of the largest axemakers there immediately brought out axes according to pattern, and sent the association as presents some cases of them. All these axes were not at first a success, but there are now half-a-dozen brands coming to the colonies of wide-blade, short-polled axes of the approved pattern, and these are quickly becoming the only axes salable to bushmen and others who have to cut timber quickly, while the old brands of narrow-faced axes are being sold out to persons in towns for use on their wood heaps.

The same applies to the saws. Mr. A. Goold, of Sprent, Tasmania, evolved or invented a new pattern of saw. Instead of patenting it and thus making a fortune, as he might perhaps have done, he gave it to the world through the medium of this paper. The great firm of Disston & Sons, America, at once brought out saws to the pattern, and the consequence is that every champion prize at the annual carnival since has been won by a Disston saw, and as men come to compete at these carnivals from every colony each year, these tools are seen and viewed by them with the result that throughout the colonies to-day axes and saws made to shapes, sizes, etc., as suggested by the United Australasian Axemen's Association and persons connected with it, are becoming better known and more widely adopted.—*The Australasian Ironmonger.*

*The Hardwareman* (London) discourses on the same subject apropos of a letter from an English colonist in Ringarooma, who wrote that of the thousands of implements in use there not 100 were of English manufacture.

"We know the British woodman's axe; it is long and narrow, flat on the sides, edge slightly turned and only sharpened in front. This suits British requirements, for in England we lay the axe at the root of the tree in true apostolic fashion; but the colonist, who goes a colonizing, strikes at a point about 3 feet up. He therefore wants an axe adapted to the horizontal position, shorter in reach, and with wider and more expansive edge. Long years ago this palpable fact was pointed out to the British manufacturer. But did he forthwith proceed to meet the demand? Not much; he isn't built that way. He thought his market was secure, and so he sent out what he chose. Did the docile British colonist accept the offer with gratitude? Not much; he isn't built that way. He promptly communicated with Uncle Jonathan. Uncle Jonathan recollected that he himself had recently done a bit of forest clearing—'wild is the forest primeval,' as Longfellow tersely puts it—and promptly sent John Bull, Junior, at Ringarooma and elsewhere, the desired article."

### Notable Increase of Exports to Africa.

A RECENT number of *Bradstreet's* gives interesting data showing the increase of our trade in Africa, and especially with the southern part of it, or what is called British Africa. While the amounts mentioned are not large as compared with the sum total of our export trade the rate of increase is quite impressive.

In the fiscal year 1895 our total exports to Africa were of the value of \$6,337,840. In 1896 they were \$13,870,760. In 1897 they were \$16,953,127. Thus in the last fiscal year the exports to Africa showed an increase of 22 per cent. over 1896 and 165 per cent. over 1895. The exports to British Africa were 81.5 of the total African exports in 1895, 81.4 in 1896 and 77.2 per cent. in 1897. Though British Africa furnishes the greater part of the business, yet the figures show that the increase in other parts of Africa has been even larger than in that for which separate returns are made.

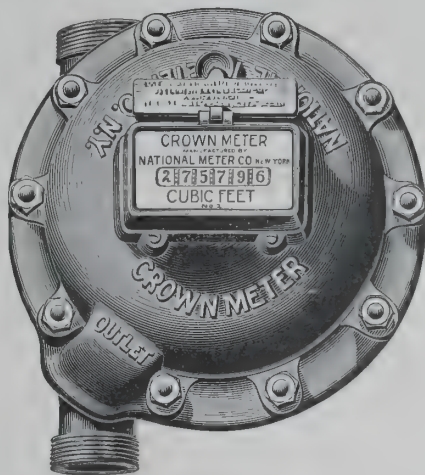
### The Oil Trade of 1897.

THE year 1894 showed the largest export petroleum trade up to that date. But in 1895 there was a falling off. The extraordinary efforts of the Russian refiners checked the shipments of American oil to India and other Eastern countries. The war between China and Japan had its influence in reducing the exports of American oil, as of other American products, to both those nations. But American perseverance reaped success in 1896. We not only recovered the trade lost in 1895, but made such further gains as to bring the total exports beyond those of 1894. The exports of refined oil in 1896 amounted to 753,577,089 gallons, a gain of 80,995,912 gallons over 1895. Crude oil, refined oil, and naphtha showed together 40,000,000 more gallons exported in 1896 than in 1895. If we add the shipments of residuum and lubricating oils we make the total of all exports more than 936,000,000 gallons. It is too early to present any figures for the year 1897, but there is every prospect that the record for 1896 will be eclipsed. The first six months of the year show a gain in exports of refined oil alone of nearly 25,000,000 gallons. Other products in like manner more than held their own, while all indications point to great gains for the second half of the year. We can safely predict that when the record for 1897 is completed it will be found to be the largest in the history of the industry.



Interesting Information for Water Works Officials about

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**They increase the revenue,  
Restrict the waste,**

and assist in maintaining a uniform pressure in the water main.



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118 CHAMBERS ST., NEW YORK.

**The Largest Water Meter Manufacturers in the World.  
Over 188,000 in Service.**

[FEBRUARY, 1898]

City of Highland Park, Illinois.

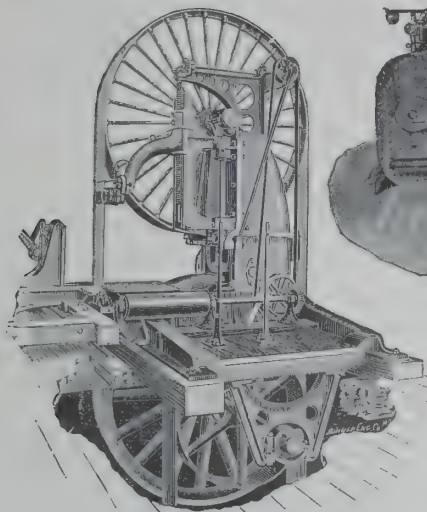
NATIONAL METER CO.,  
298 Broadway, New York.

GENTLEMEN:

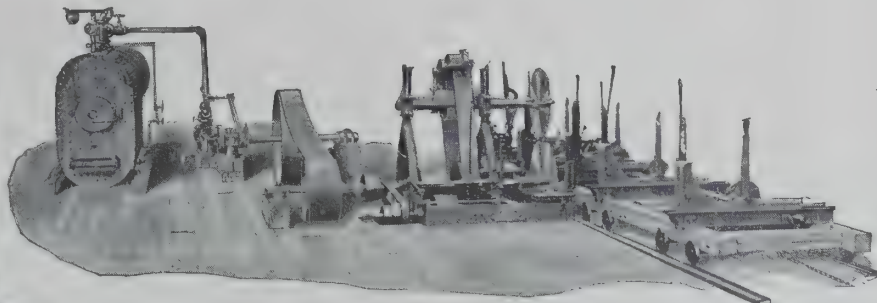
Replying to your favor of the 3d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN.  
Chairman of Water Committee.



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THE MOST MODERN.

BAND MILLS—6, 8 and 9 foot wheels.

CIRCULAR MILLS—All sizes. Suitable for handling any size and kind of timber.

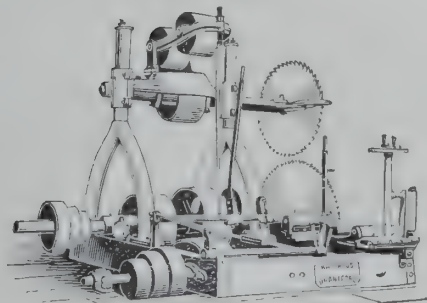
BAND RE-SAWS—For Saw Mills. Increase largely quality and quantity of daily output.

STEAM-ACTING SAW MILL APPLIANCES.

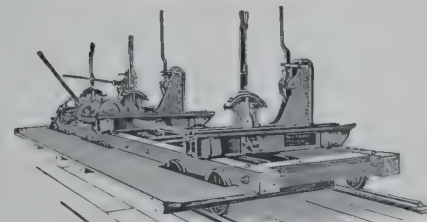
PULP WOOD MACHINERY.

BARKERS—With automatic turner; one man barks 15 cords, 10 hours.

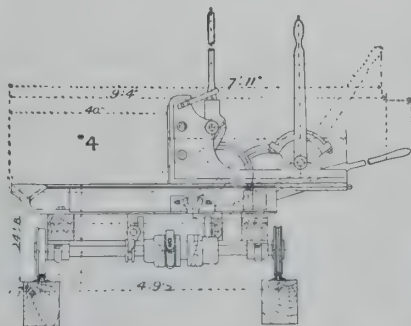
AUTOMATIC CUTTING-OFF SAW—2 men with this machine cut 60 cords of pulp wood 16 to 24 inches long, or 100 cords 48 inches long in 10 hours, taking logs from water and delivering cut wood to conveyor.



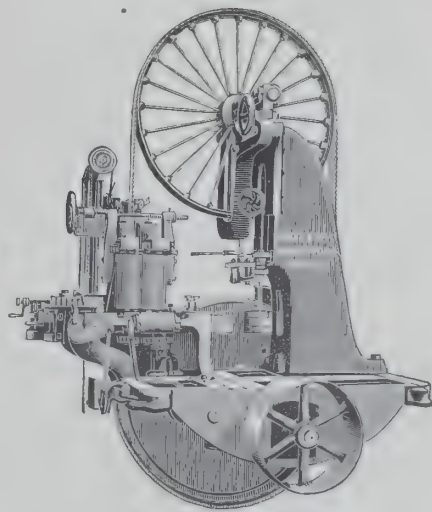
Saw Frame No. 3.



No. 5 Log Carriage.



No. 4 Carriage, showing Off-set for Band Saw.



Band Re-saw.



Established 1844.

New Works, 1896.

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### File Making by Machinery.

THE file is one of the oldest tools known and one of the most widely used.

It is recorded in the "First Book of Samuel" that the Hebrews were possessed of files more than a thousand years before the birth of Christ, and had then reached such a point of excellence in the manufacture of them that there were different styles and sizes for many different uses. They must have been made in much the same manner as they continued to be up to thirty years ago, by hand, with a chisel and hammer, and as a few of them are made to this day.

In England, up to thirty years ago, although there were large finishing works and shipping depots, and the responsibility was assumed by firms, file cutting was a cottage industry. Within five miles of Sheffield and Warrington hundreds of file cutters lived and applied their skilled craft, and the wayfarer might see blond or grizzled heads lowered at the quaint casement windows and hear the rapid strokes of the hammers on the chisels or note the infrequent pause when the cutter looked out upon his flower beds or off to the wooded hills.

The expert file cutter could finish two dozen bastard cut flat files in a day. When cut the files were sent back to the factory to be tempered, tested and finished for the market.

To the sense of sight and touch these hand-cut files seemed to have every tooth of the same size and the spacing mathematically accurate. It was only when machine cutting was attempted that attention was called sharply to the fact that it was in the irregularity of the spacing and the depth of the indentations given by the flexibility of the human vise holding the chisel that the virtues of the hand-cut file consisted. The perfectly regular teeth produced by the fixed mechanically operated chisel of the early machine were found to groove or channel the work—that is, the teeth followed in each other's tracks, cutting in the hollows instead of the rear teeth cutting away the projections left by the forward ones. All the efforts of inventors of file-cutting machinery have been bent toward securing a reproduction of the hand-cut work, and the peculiar requirements explain why the invention of a satisfactory device was so long in coming. Although apparently so simple, the file-cutting machine as it stands to-day represents one of the most triumphant achievements of modern machinery, endowed as it is with something like human nerves and intelligence.

The amount of cut that any file will make at a stroke depends on the area of cutting edges in contact with the work and also upon the pressure exerted. Paradoxical as it might seem, the smaller the area of cutting edge under a given pressure the greater will be the amount of metal removed. In the machine-cut files of a dozen years ago the regularity of the teeth had the defect of presenting too much cutting area to the surface of the work, and besides "channeling," the indentations between the teeth were more rapidly filled up with filings than was the case with the hand-cut file, so that the workman dared not apply all the pressure necessary to accomplish the work desired, and was often forced to stop to clean the "pinnings" from the teeth. As a result, in a very short time after being introduced the machine file had a deservedly bad name and was thrown out by workmen, who refused to use it.

But gradually every mechanical difficulty was overcome. Step by step machinery was invented that met every requirement. The name of Ericsson, the great engineer, is associated with one machine device—that which graduated the depth of the cut. This, with another equally important graduating the spacing, solved the problem of how to secure a machine stroke that should fairly rival the nervous tension of the human arm and impart the infinitesimal variations in the height and force of the drop of the hand-cutter's hammer.

In a modern file-cutting shop the processes begin with the cutting of the steel rods which arrive flat, square, triangular, round, or half round in cross section and in diameters varying from a slate pencil to a crowbar. These are fed to a pair of power shears, which clips them at the rate of 2,000 dozen a day into lengths that are then conveyed to the forging shop. Each power hammer has a little brick gas furnace for heating the strips of metal. The furnaces are tended by boys, and the strips are lifted out by workmen with tongs and manipulated under the hammers that come down with a thousand-pound stroke more than a hundred times a minute. In less than a moment the bar is rounded, tapered and pointed and the tang forged at the other end. The rapidity of the whole operation may be judged from the fact that 25,000 files a day can be shaped on thirty anvils—100 an hour for each machine. The red-hot bars have scarcely time to lose their fierce glow from the furnace to the iron truck in which they are wheeled off to the annealing room to be softened for the grinding, stripping and cutting. The "blanks" or blank files, which have now a mottled, rough appearance from the forging and the softening in the furnaces, are sent in batches on long rolling carriers to the grinders, who operate ten

power machines and as many more stones by hand. The great grindstones, such as the Sheaf or the Schuylkill, never blinked at or rippled over, are shut up in a framework, forming boxes ten feet high, from which comes the peculiar ear-splitting sound made by stone on steel. All that is required of the machine grinder is to put a number of blanks in a plate holder, which closes up against the stationary stone like a furnace door. With the revolution of the wheel the plate goes up and returns, and one surface of the blanks has been made true and smooth. When all the surfaces of the blanks have been ground they are fitted into the stripping machines, which consist of vises and sliding file strips on long, horizontal tables.

Testers now take these blanks one by one and, with a hand-cutter's short chisel, test them to see if they are level. Those that are imperfect are sent back to the grinder, while the others pass on to the cutting machine, each one of which occupies scarcely more room than a sewing machine and is operated by girls and boys as well as by men, each machine being adapted to its particular task of cutting edges or sides in single or double cut on the various shaped files. The blank fits into a groove and is automatically fed to the chisel, that comes down at the rate of 4,000 times a minute on the small files, cutting from 50 to 200 teeth to the inch, and finishing one row of cuts on the side of the file in six or seven seconds and making no two teeth exactly alike from point to tang, but increasing them imperceptibly.

The product of each machine is numbered, so as to keep tally on the machines, and the testers reject imperfect files. The perfect ones are covered with a paste of various substances, to protect the teeth from direct contact with the fire, and are then heated in a crucible filled with molten lead. The hardener must be an expert and able to tell from the cherry redness of the color when the files have reached a certain temperature. With natural gas the tempering, it is claimed, is much more perfect than with any other kind of fuel, for the supply can be regulated by the turning of a screw and the heating made as accurate as clockwork. The files are taken from the furnace one at a time, lifted by the tang with a pair of tongs and plunged into brine vats with apparent carelessness as to which way they go down. But in fact some are dipped in perpendicularly, others horizontally or at various angles, as experience has proved to be best to prevent warping. Should they become warped in the process, however, they are straightened with lead hammers on tables of lead before becoming entirely cool. The files are scoured clean with steam scrubbing machines and dropped into tubs of lime water.

When they are taken from this bath they have not the beautiful black color that they have on hardware dealers' shelves, but are gray and ashy looking, after which the tangs are annealed by dipping in molten lead. The tester now draws a piece of stiff steel across every surface, to find soft spots or imperfect teeth, and those that do not come up to the standard are put aside and sold as "seconds." The files are now oiled, sorted, wrapped in oiled paper to prevent their rusting, placed in labelled boxes and are ready for the filling of orders.

The following extract from the report of the Sheffield correspondent of the *British Trade Journal* is interesting in this connection:

I saw the other day in the warehouse of one of our establishments a large number of files of all grades and sizes, beautifully packed in boxes, and a brave array they made on the shelves. They formed part of an extensive order which had been sent to Philadelphia and executed with a smartness which left nothing to be desired. Files were taken at random from these boxes and put before me. They felt lighter in the hand than an ordinary Sheffield-made file, but that was no objection, for the workmen preferred them. The precision with which the teeth were cut and the finish put upon them could not be denied by any unprejudiced person. One kind of file, perfectly round, was shown to me as an article which could not be made in England at all. The price was considerably under the home quotations. File prices, as everybody knows, are governed by discounts. In Sheffield the discount is from 52½ per cent. to 57½ per cent. off the list, with 5 per cent. off for cash. These American files are delivered here at 70 per cent. off, and the gentleman in whose place these were shown to me was offered the agency, with an extra 7½ discount.

ROBERT LAIDLAW, the head of the Laidlaw-Dunn-Gordon Company, of Cincinnati, is full of reminiscences. He told this one at the Manufacturers' Convention recently: "I came over once on the steamer with a young Englishman who is engaged in the lumber business on an extensive scale and who buys large quantities of American lumber. He purchased some wood-working machinery in Cincinnati, and it was promptly condemned by the workmen in his employ. They said it wouldn't do the work as well or as quickly as the English machinery they were using. He made a test and found that they could do as much in one day with the American machinery as they did in a week with the English machinery."





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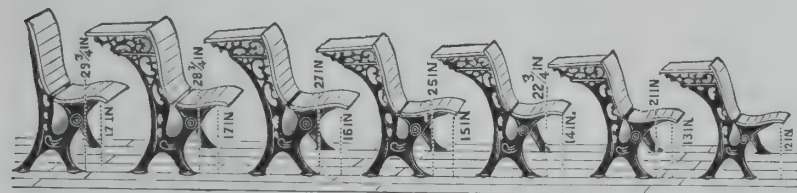
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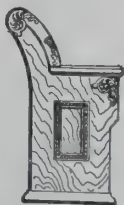
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TESTIMONIAL.

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To C. A. WOOLSEY PAINT  
AND COLOR CO.,  
Jersey City, N. J., U. S. A.

Gentlemen—I have great pleasure in recommending Woolsey's Copper Best Paint. I have used it on my Company's steamers for a number of years past, and it has given entire satisfaction. The Devonport Ferry Company's steamers "Britannia," "Victoria," "Alexandra," "Takapuna" and "Tainui" are now coated with Woolsey's Copper Paint over Metal Sheeting. Faithfully yours,

ALEX. ALISON, Manager.

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Our Kalsomine is made of the best selected material and the tints and colors are particularly brilliant and clear. We are selling large quantities in the foreign markets with gratifying results. Send a sample order. You can make no mistake, for it is the best Kalsomine in the market.

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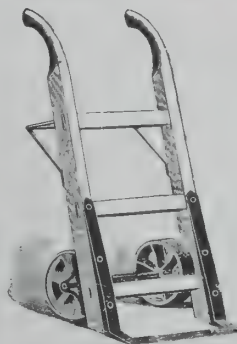
GROUND IN JAPAN.

TESTIMONIAL.

CHARLOTTE, MICH.,  
March 17, 1890,

C. A. WOOLSEY,  
Dear Sir:—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Greens are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

Yours truly,  
MAY & BARNEY.



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ALL KINDS.

Write for 100-page catalogue and prices of  
Trucks, Wheelbarrows, Handcarts, Rubber  
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LANSING, MICH., U. S. A.

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RUN LIGHT.

SELL AT SIGHT.



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Beware of Imitations,  
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MADE ONLY BY THE  
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A. H. PATCH,

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BREAKS  
OR FAILS  
TO DO  
GOOD  
WORK



### How a First-Class Monkey Wrench Can Be Cheap.

PROBABLY no one article of common mechanical use, at least none so small and apparently so insignificant, has had so much thought employed in its development and continual improvement, and has had so many facilities employed in its multitudinous production as the monkey wrench. Monkey wrenches are cheap, or low in price, and they are at the same time wonders, not of worthlessness but of usefulness, of value, of excellence in wrenching facility. They are cheap as a consequence of the persistent efforts not to make them cheap, but to make them good. The producers who set out in quest of the cheap alone are never the stayers. The successful quest is always for the production of the good article, and the most successful and lasting quest is for the production of the best.

These wrenches are of great variety of design. Some of them consist of but two pieces of metal; some very good ones have but three pieces. I was looking at and admiring one a day or two ago, which had four pieces, all told. There was the main piece of the wrench, comprising both the head and the handle, with teeth at the back of the shank for the worm to engage. Then there was the sliding jaw, the worm setting between the two ears at the back of it, and a screw passing through the lower ear and tapped into the upper one, with a straight part between on which the worm turned smoothly. The wrench was light and strong and without shake, finished and case hardened all over, and smooth and pleasant to handle; it was, in fact, one of the standard wrenches of one of our best-known manufacturing concerns.

These wrenches, and many similar articles of manufacture, are now sufficiently familiar to all of us. How many of us realize the fact that no single living man could make one of those wrenches? No one man could make a wrench precisely the same in shape, in detail of finish and in general appearance, nor a wrench in all respects as strong and reliable, no matter how much time he might put on it, or how much money he might be paid for it. No purchase price however high could have the effect of concentrating in one man the range of ability required. This may be a rather big assertion, but there can be little doubt about it. The price of a single meal will buy the wrench, and yet no one man can carry all the skill which produces it. We can even narrow down the task. We can assume the wrench to be already designed, an operation extended over a century, and which thousands have helped at. We can assume the model wrench before the man, also the precise material at hand, the shopful of special tools and facilities all ready, and we do not even then know where the man can be found competent for all the operations involved.

An outsider cannot enumerate all the mechanical operations involved in the production of the wrench. Some curious operations about it we can only guess at. In drop forging the main piece out of a straight bar there is some little trick about getting the stock for the head all right. After the sliding jaw is roughly dropped, there is another trick about forming the hole where it slides over the shank; then other tricks occur all the way along. On the shank and the sliding jaw alone at least the following operations must come in: Drop forging, punching, annealing, milling, grinding, buffing, tumbling, drilling, tapping, case-hardening, and perhaps a little chipping in the earlier stages and a little filing in the later. The screw is a simple screw machine job, while the worm requires an automatic machine with some special devices, or two or more operations may be involved in its production. Now, any one knows that no man in the shop, even with the tools all standing ready adjusted and waiting, could go around and do all these various operations correctly, if at all. The man at each machine or furnace, or what not, is more or less a specialist, and the special training and skill brings both perfection and cheapness, but evermore narrows the successful and profitable range of the individual worker. The true cheapness, the liberal value for the price, has always been brought about by seeking, primarily and constantly, perfection of product. Facility and rapidity of execution, the essential conditions of cheap production, have inevitably followed, and the user, in the long run, has always reaped the benefit.

—*American Machinist.*

### New Steamship Lines from San Francisco to Chili and New Zealand.

THE Postmaster-General of New Zealand has notified the Dominion Government that the Legislature of that colony has passed the Pacific Mail Subsidy bill and that arrangements have been made for alternate sailings to and from Vancouver and San Francisco so as to give a regular fortnightly mail service. Hitherto the steamers of the San Francisco line have operated independently of the Canadian Australian line, sailing sometimes from that port within three days of the departure of the Canadian steamers from Vancouver. But hereafter the two lines will arrange their monthly sailings to give a regular

fortnightly service to New Zealand, and both will share in the subsidy. The first mail steamer, *Vancouver*, under the new arrangement, will sail on February 10th.

Corroborative information has been obtained regarding the establishment of a line of steamers between Valparaiso, Chili, and San Francisco, as reported by Consul Wilson, of Santiago, at the State Department. The companies interested are the *Compania Sud Americana de Vapores*, of Chili, and the *Pacific Steam Navigation Company*, of Liverpool, England, which at present operate only to the south of Panama. The opportunity for invading the Northern Pacific is afforded by the expiration of an agreement with the *Pacific Mail*, by which the business north and south of Panama was divided.

The vessels of the *Chilian line* are prepared to carry guns in case of war, and on that account receive a subsidy from the government, while the English company is in receipt of a postal subsidy from both Chili and Peru. The vessels to be placed on the Valparaiso and San Francisco route will probably be the *Chili*, *Peru*, *Santiago* and *Arequipa*, of the *Pacific Steam Navigation Company*, and the *Loa*, *Palena*, *Imperiale* and *Aconcagua*, of the *Compania Sud Americana de Vapores*.

### Raising a Wreck with Magnets.

“A PROPOS of magnets for lifting purposes,” says *Cassier's Magazine*, January, “it is interesting to note that some one has suggested their application to the raising of iron and steel vessels sunk in deep water—too deep to admit of the employment of divers. One proposed scheme has for its object the raising of the ill-fated *Victoria*, of the British navy, which now lies at the bottom of the Mediterranean, in 450 feet of water, off the harbor of Tripoli. The weight of the wreck in water is estimated at 7,000 tons, and the suggested methods of raising it is as follows: Powerful hydraulic rams and dynamo machines and a series of heavy electro-magnets are to be arranged on pontoons at the scene of the wreck. A magnet lowered over the side and coming within reasonable distance of the sunken vessel would be drawn towards the latter, and, on touching any iron or steel part of it, would immediately stick to it with a power of 100 tons. As each magnet made attachment, which would be indicated by means of an electric dial on the pontoon, a trial pull would be given to the rope to ascertain that a connection had been made to a firm part of the wreck. Should this not be the case the magnet would come off; its position would be then slightly moved and a fresh attachment made until a firm hold had been taken of the wreck. When all the magnets had been thus fixed, the wreck would be considered ready for raising. . . . All this is at present simply in the nature of a suggestion, more interesting probably than practically valuable, especially as the roughly estimated cost of its execution runs up close to the £100,000 mark.”

### American Dynamite in South Africa.

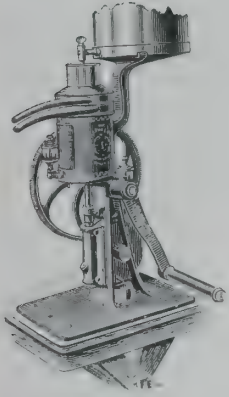
IN the advance-sheets of consular reports for January, just issued by the Bureau of Foreign Commerce, there is a report from Consul F. W. Roberts at Cape Town concerning American dynamite in South Africa. In part the consul says: “At present the United States furnishes more than any other country to this portion of the world. It is satisfactory to note, however, that this steady growth may be ascribed to the superior quality of the American goods, which is attested to by nearly all mining men on the Rand, irrespective of nationality. This is shown from the fact that dynamite can be delivered in the Transvaal from Hamburg, including cost of importation and duty, at 37s. 7d. (\$9 39) per case, and from Dr. Nahnsen's factory for 46s. 1d. (\$10 87), while the rate from America is 47s. 7d. (\$11.22), but the latter country, nevertheless, secures the greater part of the trade.

### New American Line Steamers.

THE Empire Transportation Company was incorporated yesterday at Trenton, N. J., by Clement A. Griscom and others of Philadelphia. The company has bought the five steamers of the old American Line from Philadelphia to Liverpool, lately owned and operated by the International Navigation Company from Philadelphia to Antwerp, and will form a new line from Seattle to St. Michaels, which will be opened in the Spring. One of these steamers is about to leave Philadelphia for Seattle. These boats will be replaced by the International Navigation Company's boats from New York to Antwerp, and four large boats will be built by the Cramps to run on the New York and Antwerp line of that company. They are to be fitted for both freight and passengers. Plans for the new boats are being drawn and they will be built as soon as practicable.



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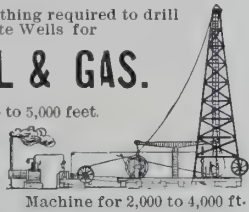
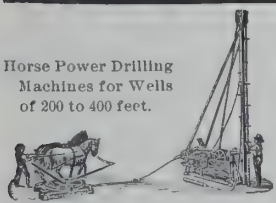
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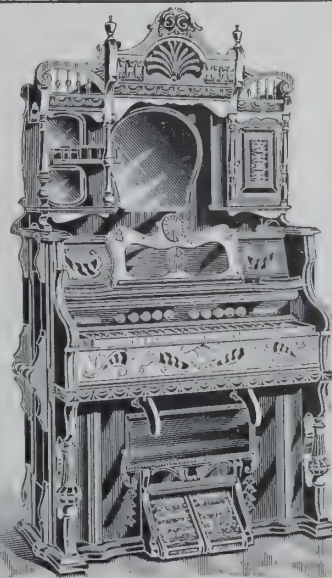
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### American Machine Tools in England.

MR. JOSEPH HORNER, of Bath, England, recently contributed a long article to *Engineering* (London), entitled, "Some Lessons of the Stanley Show." We quoted briefly from this in our last number, but space did not admit of extended extracts. The writer was concerned chiefly with bicycle-making machinery, but much of what he described belonged to types that could be used in other shops than those devoted to the manufacture of bicycles. Mr. Horner is chiefly concerned to note the extent to which American tool-builders have invaded the English market and the reasons for their acknowledged superiority along certain lines.

"Of course one cannot suppose that American engineers and mechanics are more richly endowed with mechanical genius and skill than ourselves. But other qualifications than these are essential to success in a time like the present, when England is but one section of the world's workshop. Such qualities as these are of equal value, and under similar conditions of mechanical skill will turn the scale. One of these qualifications is to study the precise wants of users of machinery and tools, and to cater for those wants as carefully as possible, unhindered by preconceived ideas and conservative prejudices. This method involves not only questions of general design, but also the working out of an almost infinite number of minute details, including accessories, feeds, movements, both for saving time and conducing to efficiency of results; details which have their highest development now in the numerous automatic machines which do everything but talk, and which are at once expeditious, accurate and self-attending.

"The second condition is that the thought of finality must give place to that of progress. There is no machine which is so good but that it may be improved upon. If any real improvement is seen to be possible, then drawings, patterns, stamps and special tools must be altered or re-made, so that the best possible results are secured thereby.

"The more highly developed, the more complicated a machine becomes, the more perfect must its workmanship be. This involves the design of the most perfect machine tools and small tools for the production of this perfect work. And inasmuch as this is only possible financially by the sale of a large number of machines, it further includes the adoption of a perfect shop system, or that under which interchangeability of parts is secured, while the actual cost of labor on any single piece is almost infinitesimal—a fraction of a penny in some cases, in others a few pence or cents only.

"In these main reasons, with all that is involved in them, is to be sought the cause of the practical monopoly by the Americans of the cycle-making machinery. In these cardinal matters English methods and American methods differ substantially. We are conservative in method; they are alert and progressive. We tread in time-worn grooves; they seek more excellent ways. We do not adopt the interchangeable system to the same extent as they do. American shops are becoming increasingly specialized, and to a much greater extent than the English ones. The principle interest in the machinery stands centered in the screw machines. To make such machines as these, the highest specialization in design and the best workmanship are necessary. In each instance, all which the attendant has to do is to insert the length of rod or stock from which the screws have to be cut. The tools in the turret perform the various turning, threading and milling operations required, the tools in the cut-off rest part off the work, and the rod is fed forward automatically to the length required for the next screw. Lubrication is provided by a pump and pipe, or 'spreader,' with several openings over the work. Once started, the machine runs till the rod is used up.

"An instance of the American idea of gaining every second possible may be noticed in the action of the turrets and parting tools. The moment that each tool has finished its work, the turret moves back at a rapid rate, very much quicker than the cutting speed, and after revolving to present the next tool, comes up rapidly until it nearly touches the work, and then slows down to the cutting speed. The parting tool also jumps back quickly the instant the work is cut off, to make room for the turret again.

"Excepting in so far as the employment of cam-operated movements is concerned, these screw machines have few points in common. They illustrate how inventive genius may accomplish similar ends through diverse designs, and that under the pressure of business rivalry the American toolmakers have not only ousted English screw machines from the cycle shops, but are able to offer a choice of several types of absolutely automatic machines, requiring not only no skilled attendance, but a single attendant can look after eight, ten, or even more, in some cases. Should English firms attempt to regain what they have lost in this respect and recover the market by superior machines, they will have

a long lee-way to make up. For it is vastly easier to lose a market than to recover it.

"Special types of lathes, of which English makes were either absent or poorly represented, were the screw machines with turrets for turning and boring hubs and cups, for facing sprockets, and doing other work of a cognate kind. It seems that to shape hubs with broad forming tools operating back and front, to screw threads with opening dies, to turn and bore sprockets, to mill edges from the turret, besides much else, one must get American tools. No English machines were performing these operations at the show. The quantity of material removed in a few minutes by forming tools in turning hubs from the solid bar would have been pronounced impossible by any workman half-a-dozen years ago. But there remains the fact, nevertheless, that the hubs can be turned more cheaply thus than by using drop forgings in which the amount to be removed by turning is slight.

"The perfection of these American designs is observable in the friction-gear heads, in the wire feeds, in turret arrangements, in the lubricating apparatus, in stops, in the steadying and centring jigs, by the use of which eccentricity of turned and screwed parts is rendered impossible. The feeding of a flood of lubricant under pressure through the turret centre along oil-tubed drills directly to the cutting point, is a nearly recent feature fitted to American turrets. The quantity of lubricant used, mostly expensive lard oil, would frighten an old-time believer in the drip can; but then, with tank-beds and trays and a centrifugal separator, the oil is almost wholly recovered and used again and again. The constant flood of lubrication also permits of heavy cutting, while the tool edges are preserved for a long period intact. The use of the turret is not confined so closely to the holding of single drills, reamers and cognate tools as it is with us. Box tools predominate, and these are so constructed that work is easily turned to thousandths of an inch, with true cutting tools, ground and set to correct angles. Though tools of this type are used in English shops, they have not reached so high a degree of development, and such infinite variations, as those sent from America. Exceptions occur in those English shops which are modelled on American lines and methods, such, for example, as the Small Arms Factory at Enfield Lock. And it is easy to see why the tools endure so long without re-grinding; the rate of turning is not rapid, but there is no time lost, on the one hand, nor tools unduly forced by the introduction of the human element, and the lubrication is most abundant. The numerous milling machines, drilling, grinding and other machines must need be passed without observation. Sufficient has been said to indicate one direction in which English manufacturers have permitted the invasion of foreign machinery in large quantities, and even the English manufacturers go to the American agents for their small tools. At Churchill's I was shown £2,000 worth of American twist drills on shelves. Micrometers, calipers, milling cutters, reamers and all kinds of small tools for working metal and wood were also closely packed in ranges of shelving. There are six agents for American machinery in London alone, besides others in the provinces; and large numbers of machines are ready for immediate delivery. If a machine does not happen to be in stock, it can generally be delivered from America in from three weeks to a month."

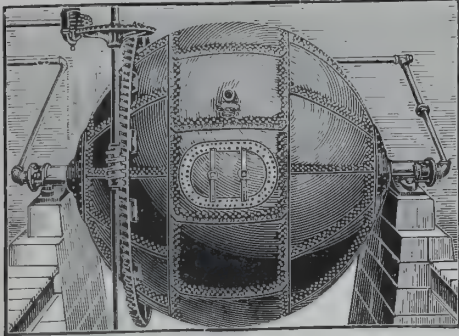
### Electric Elevators for Private Houses.

A PROMINENT New York firm engaged in the manufacture of electric elevators has recently developed a new type of electric elevator for private houses which embodies every modern facility for convenience and safety. Among the many improvements perhaps the most important is a novel safety push-button system. In each hall of the house is a single push-button, which, when operated, brings the elevator to the floor at which the passenger waits. Upon arriving the elevator automatically operates a mechanical door fixture or hall door, which allows the latter to be opened. Otherwise the door is securely locked and cannot be opened from the hall.

Electric door contacts are also provided, the object of which is that if by the merest chance a door is open on any of the floors leading to the elevator it would be impossible to start the elevator owing to the circuit being broken, necessitating first the closing of the door wherever it may be. Push-buttons are provided in the elevator and are numbered to correspond with the floors of the house. It is only necessary for a passenger to push a button corresponding with the floor desired to be reached when the elevator proceeds to the floor, stopping at its destination automatically. An extra push-button in the elevator enables the operator to stop immediately while in motion, thus enabling the car to proceed in a different direction if desired.

Owing to their ease, simplicity and safety of operation by inexperienced persons a very large number of these elevators, equipped as above described, are in use throughout the country.



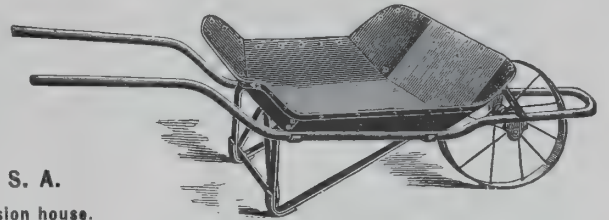


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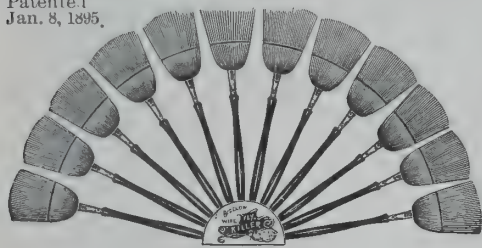


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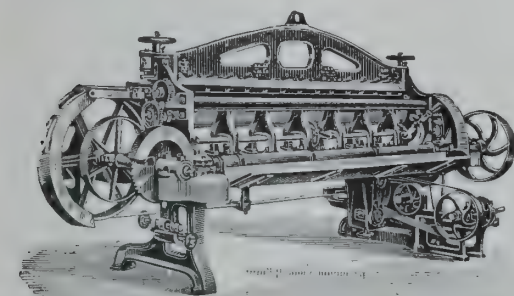
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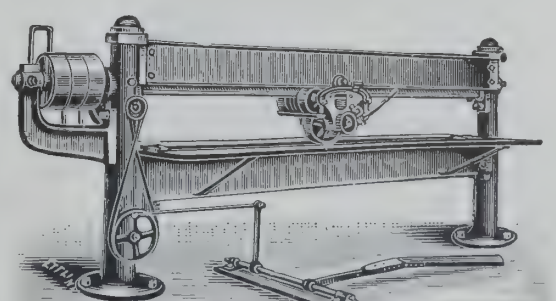
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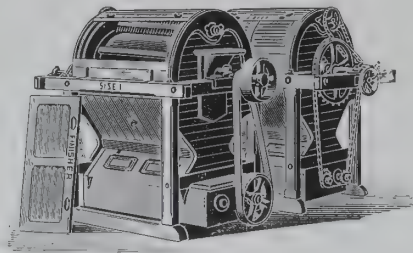


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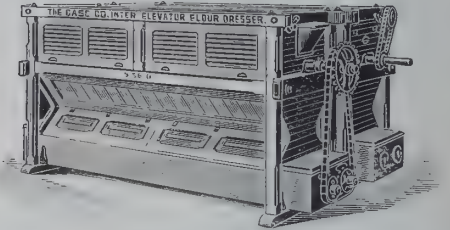
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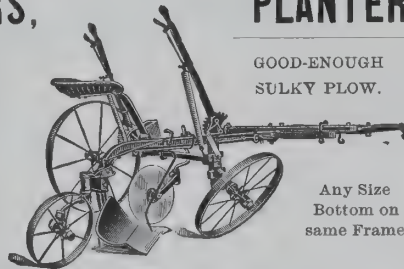
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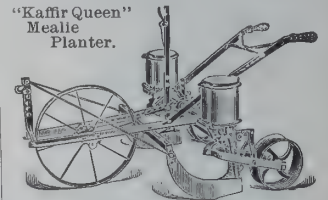
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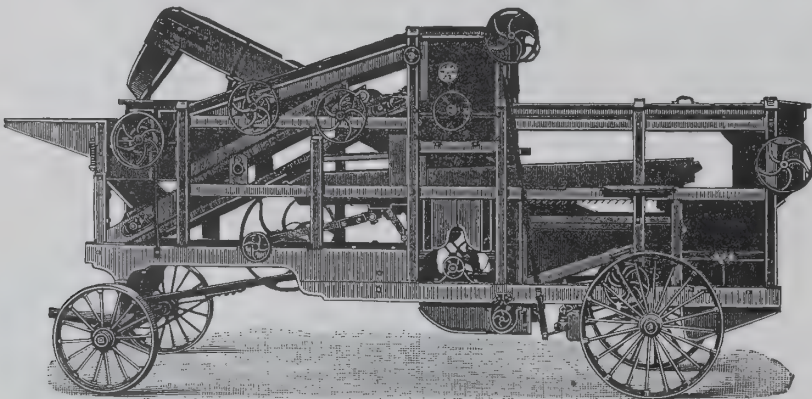
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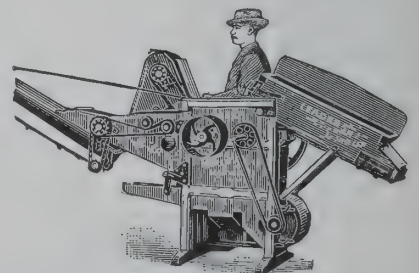
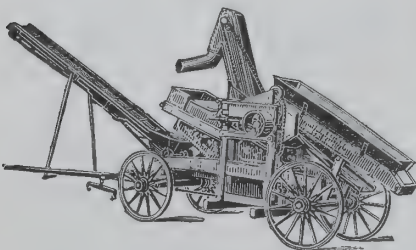
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DUSTLESS CYLINDER CORN SHELLERS, HAND CORN SHELLERS.

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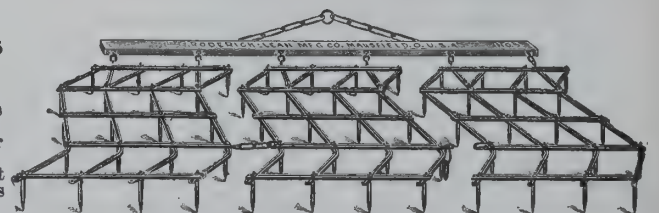
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Manner of Packing secures Lowest Rates for  
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Mansfield, Ohio, U. S. A.





*Devoted to the Foreign Trade in Agricultural Machinery and Implements.*

## A History of the Origin and Development of the American Reaper and Binder.

A RECENT number of the *New York Tribune* contains a valuable account of the series of inventions by which what is perhaps the most important of all American agricultural machines reached its present high degree of perfection and efficiency. We give below those portions of the article of greatest interest to our readers, omitting the names of the numerous inventors whose improvements are chronicled since they can have only a minor value abroad as compared to that of the improvements themselves.

For the germ of the idea that finally found its highest expression on the prairies of the West, America is indebted to England. As early as 1808 an English inventor had devised a self-raising reaper, which, though hardly practical, was decidedly suggestive. In 1822 an English schoolmaster made and operated a machine that actual tests proved to have some promising features. His machine was drawn, and it cut the swath beside which the horse walked. Its operator succeeded in making fair gavels. The only feature, however, that proved valuable in the development of harvesting machinery was the reel he provided for laying the grain upon the platform.

In 1826, a Scotch inventor made a machine that was so nearly successful as to seem to warrant its introduction; but it was adapted to be pushed before the team of horses, and, the British harvest fields being small, its encumbrances militated against it. Several were made, however, and operated for years; and at least one was introduced into the United States. It was provided with a reel that could be raised or lowered, or moved far in advance of the cutting apparatus, if desired. The swath of grain was delivered at the side of the machine by an endless conveyor. It was so sustained upon supporting wheels as to require no special means for securing its push tongue to the team operating it. It lacked nothing in the matter of proper gearing. But its cutting apparatus was defective, although embodying the shear principle which, modified so as to change its action, is still in use. The cutting blades were pivoted together like the blades of common shears, and where damp, dead blades of grass were encountered it met with the same difficulty that is encountered in using hand-shears when an attempt is made to cut wet paper.

It was at this point that the first American inventor took hold of the machine. How far he was indebted to his English predecessors it is now impossible to determine, but he was a keen observer, and had no doubt become informed of what had taken place in Great Britain; had learned the defects in those early machines, and hence had devoted his attention particularly to the cutting apparatus, which had so far proved, when practically considered, a stumbling block. So familiar is every reader with the cutting apparatus of harvesting machines of to-day that it is necessary only to say that in no way has it been modified since it left its designer's hands. Good judgment had prompted him to make the machine as simple as possible.

As it is over the exact progress of events at this point and over the precise dates that the greatest battle in the revolution of harvesting methods has been waged—a battle the echoes of which have not even yet wholly died away—it is necessary to be a little cautious in stating our dates. The weight of evidence appears to prove, however, that the inventor whose improvements we have just mentioned, began experimenting about 1830, and that the first successful trial of his machine took place in 1833, in which year his machine was patented. The following year another inventor patented a machine for the same purpose, and the rivalry between the two naturally became very keen.

The differences between the two machines were numerous. The earlier patent was for a machine to be drawn, the later for one to be pushed, like the first English experiments. The cutting apparatus differed also. The 1834 apparatus consisted merely of a straight bladelike bar with a filelike edge, moving under forwardly projecting pins. Lacking the aggressiveness necessary to engage the straws and hold them while being cut, the natural tendency was for the machine to lean them forward and pass over them. The application of a reel prevented this, as the latter would hold the standing straws and grass as advanced upon so that they would be cut reasonably well, where field conditions were not too bad. The cutting apparatus of the 1833 patent, as already remarked, was practically that in universal use to-day. There was one other

notable difference. The earlier machine provided a seat for the raker who was to deliver the gavels to the ground while the other did not, the raker having to walk behind the machine and haul the gavels therefrom. Under these circumstances, the team must travel very slowly, for the reason that the labor of "raking off," being great under the best conditions, became excessive when there was added the fatigue of walking from twenty-five to thirty miles a day.

The fact that there were rival machines in the field, however, proved an inestimable benefit to the farmer, who necessarily gained by every additional improvement made to secure or hold his orders. The possibility of gain in the new field of manufacture awoke great activity, and the desire to monopolize under the patent laws became so great as to prompt many to take advantage of every possible right due the inventor.

The battles in the harvest fields, and in the courts as well, it must be confessed, were hot indeed throughout the forties. The inventor of the successful machine of 1833 devoted most of his time to the improvement, chiefly in minor details, of his cutting apparatus. In the course of a contest regarding the renewal of his patents on this device, Peck, the examiner in the Patent Office, said:

"There can be no doubt of the great value of the invention of the cutting apparatus of the harvesting machine, as it lies at the foundation of this, one most important of agricultural machines."

With the practical perfection of the cutters, attention began to be directed to automatic means for delivering the gavel from the receiving platform to the ground. In 1851 a self-raking reaper was patented, which was eminently successful from the start. Simple in construction, and thoroughly satisfactory in its operations, it was soon applied to many of the reaping machines that had then become prominent.

The self rakes so far mentioned had no sooner won their way into public favor than a new mode of operation was conceived for accomplishing the desired result. In 1852 an inventor produced a rake that could also operate as a reel, which, improved in nearly every detail, is used at the present day. His device consisted of a vertical shaft properly supported, and carrying thereon four reel arms so geared as to sweep the platform of its accumulation in a given number of feet of travel. The rakes were in pairs upon cross shafts, and the latter were adapted to rock, so that, when moving over the platform, their path would be close thereto, but in every other part of their movement be high above the gearing. These machines, although cumbersome, were extensively used in England and Continental Europe until within a very few years.

The earliest form of header was invented about 1844, and very shortly after that the rivalry between firms was such that this device reached practically the state in which it remains at present, later years having produced chiefly minor improvements and modifications of the designs then in use.

It was not long after the first American reapers were in the fields, equipped with the improved cutting apparatus already mentioned, that it was discovered that by dropping the platform the reaper became a simple and highly effective mowing machine. The very first reaper invented had a platform adapted to be so removed and was, therefore, in a sense, the first "buckeye." It was not until 1847, however, that practical mowers came to be pushed sufficiently to make very much stir in the market. Between 1855 and 1856 a number of master patents for mowing machines were entered at Washington, and those of the latter year particularly showed principles that will probably never be departed from. The mowing machine was soon put on the market, and the same machine, with mere finishing touches and no modification except converting its wooden frame into metal, is now built to the extent of many thousand yearly by the companies founded by those inventors.

As early as 1853 attempts were directed to the perfection of a machine on which grain might be bound by manual labor, and one was built in that year provided with a driver's seat, a place for the raker, a receptacle into which the gavels might be raked, and stands for two men, to one of which and then to the other the gavels might be raked. Requiring four men, as it did, and being cumbersome, it could not, of course, hold its own with self rake reapers.

Between 1857 and 1861 a type of binder was perfected that was soon adopted by every manufacturer of harvesting machinery. It had the self-rake contrivance, by that time in general use, and carried an attachment on which two men rode, who, by the display of considerable agility and skill, could keep up with the machine, and bind, after some fashion, all the grain sent up to them by the rakes. The great mechanical advance made by this machine consisted of the fact that it delivered the swaths of grain in a position to be rapidly handled by the men riding on the machine. This accomplished, the rest was easy, and inventors soon produced various attachments, which found a place prepared for them on this harvester. (*An account of the further development of the automatic binder will be found in the March number of THE AMERICAN EXPORTER.*)



### A Pony Band Saw.

THE *Northwestern Lumberman* thus describes the test of a new pony band mill:

The test was made with both oak and pine, and was in every particular satisfactory as well as interesting to those who have watched the evolution of the saw. There were men present who had used an old-fashioned rig with a saw kerf of a quarter of an inch, and with which fortunes have been wasted in sawdust. This mill is intended to be to the modern band mill what the plantation circular rig was to the heavy rotary. The machine being provided with a large base, viz., 4x9 feet, and the wheels being but 66 inches in diameter, it will be seen that the machine in itself provides a stable and sufficient foundation. All of the journal boxes, and, in fact, all of the mill proper, are supported by this base, rendering the machine entirely self-contained.

In this instance the mill is intended for shipment to Manchester, England, where it will be used in one of the city jobbing saw mills for sawing heavy-hewed timbers, such as Oregon spruce and fir, mahogany, oak, etc. At present for this work they are using small gangs, or what they term "log frames," and it is unnecessary to state that these are not well adapted to the work, it being difficult to change from one kind of sawing to another, and in England they may desire to cut one board of one thickness followed by another of a different thickness, and, in short, saw their logs to fill retail orders for all imaginable thicknesses. This mill will be well adapted for the purpose, for the reason that it requires small space, comparatively little power, and as 18-gauge saws are used, the saw kerf is only scant 5-64 of an inch. It is estimated that had these saws been used thirty years ago, the timber in eastern Michigan would have lasted 100 years longer than it has. In a single season it would have saved 150,000,000 feet on the Saginaw River that went out into sawdust. This pony mill is designed for use in localities where the supply of timber precludes the expense of a large plant; in hilly or mountainous places, where it is desired to place the mill near the timber, and for sawing second-growth, as well as for many other purposes.

### Uses for Cornstalks.

REFERENCE was made in our last number to the fact that a commercial use had at last been found for cornstalks. Completer details of the new process are now obtainable, and we present them herewith. Of course, the success of this experiment, for its success now seems to be assured, does not mean that the entire cornstalk crop of the world is to instantly become worth \$4 a ton. Plants must first be established throughout the corn-producing region, capable of working up the product by the new processes. But it does not seem too much to say that the importance of these inventions and discoveries rival, if they do not surpass, those that resulted in the utilization of the formerly worse than useless cotton seed.

It is an old saying that "corn is king," but while farmers have all the time recognized the value of the cornstalk as a valuable food product, they have been unable to find means for extracting its digestible ingredients. The result was that hundreds, thousands and tens of thousands of acres of cornstalks went to waste every year in the United States alone, and they not only went to waste, but, scattered over the fields where they had grown, they proved to be a nuisance, as they would not rot, and if plowed under would again work themselves to the top in the process of cultivating the ground; so, in order to get them out of the way, it has been the practice to rake them into piles or windrows and burn them. It has been estimated that in the year 1895 160,000,000 tons of cornstalks went to waste. The new factories are now offering the farmer \$4 a ton for this formerly waste product.

An acre which produces forty bushels of corn will have about two and a half tons of stalks; the corn at 30 cents per bushel will bring \$12, and the stalks at \$4 per ton will bring \$10, so that the farmer gets nearly as much for his stalks, which have been considered of very little value, as he gets for his corn crop. The stalks, moreover, are marketed at a time when the farmer is practically idle. But what of the manufactory and uses of the cornstalk?

The stalks are first thrown into a large cutter, which chops stalks, blades and shucks into pieces of 2 inches in length. Then this stuff is conducted by pneumatic conveyors from machine to machine, each of which is a wonder, till the following results are obtained: First, the shucks are separated, shredded, cleaned and thoroughly prepared for the mattress-maker. Second, the shell of the stalk and the leaf are separated from the pith and are ground into a bran-like substance and packed into sacks for feed.

The Government report shows that "the new corn product contains eleven pounds per 100 more total digestible matter and two pounds per 100 more digestible protein than the whole fodder shredded. It contains as much digest-

ible matter per 100 as corn blades of pure fodder. It contains three pounds per 100 more total digestible matter and one-half pound per 100 more digestible protein than timothy hay."

Without continuing this long report further, it shows that is a far more fattening food than same weight of corn grain and fodder. It is better than wheat bran. In short, it is one of the very finest foods for stock, fed with less labor and less waste, and keeps as well as linseed meal, cottonseed meal or wheat bran. But the shuck, the blade and the shell of the stalk are only the wastes of the factory. The cellulose is the pith of the stalk. Here is the wonderful outlook of the business. This pith, or cellulose, as it is called, has a market value now of \$400 per ton, and its uses are simply marvellous. More than forty patents have already been issued, and still it is in its infancy. Cocoa cellulose, made of the cocoa nut, sold at \$500 per ton, and a limited quantity has been used for years; but the cornstalk cellulose, by Government experiment, is far superior. Its chief use up to date has been to line war vessels.

It will be remembered that in the recent Chino-Japanese war the Chinese vessels were struck near the water line above the armored deck and immediately capsized, but when the Japanese vessels, which were lined with cocoa cellulose, were similarly struck they were not disabled. When a vessel is punctured and has a cellulose lining, the water touching the cellulose makes it swell immediately, and this stops the hole and prevents water from entering the air space between the inner and outer walls of the vessel. England has sent her experts over and examined this new discovery, and one factory has received an immense order already from the English Government.

But this is only one of its uses. It has found to be the ideal packing for journals. The Reading Railroad and others have made the test and find it far superior to cotton waste. It lasts longer, requires less oil, and no hot box can result where it is used. It is a non-conductor of heat, and it is claimed to be by test 27 per cent. better than any known substance for covering steam pipes and similar uses. Excellent paper can be made from it; better than wood pulp for this purpose. Kodak films, frescoes, and all articles now made of papier mache can be made of cellulose. The smokeless gunpowder is made from it as a base, and fine varnish used for various purposes.

It is claimed that it will literally revolutionize water-proof clothing. Linoleum, imitation silk and patent leather finish are other uses. The men who are experimenting with it are being astonished by the extensive possibilities of this simple substance.

### California Big Trees for Dining-Room Furniture.

LONDON papers not long ago reported the safe arrival at Cliveden of William Waldorf Astor's section of a California redwood tree, with which he wins the bet to which reference was made some time ago. The wager was the result of some statements made by Mr. Astor at a dinner party concerning the size of the California redwoods, the owner of Cliveden staking a considerable sum on his ability to produce a cross section of one of the trees capable of accommodating forty guests when used as a dinner-table. The section shipped from San Francisco is 2 feet in thickness, with an average diameter of 15 feet 6 inches and a maximum diameter of 16 feet 6 inches. Considerable difficulty was experienced in transporting the slab of timber by road from London to Cliveden, sixteen horses being employed to draw the trolley on which it was placed. At Cliveden it was taken down the grass drive, and owing to the splintering of the planks beneath the wheels the latter frequently sank deep into the turf.

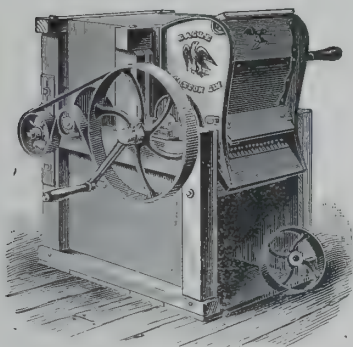
We do not know how Mr. Astor managed to procure his section of redwood, having supposed that the entire region covered by these splendid trees, which is not a very extended one, was reserved as a national park, and that lumbering there was out of the question. However, as Mr. Astor was engaged in a laudable effort to extol the marvels of his native land in the land of his adoption, perhaps the official watchfulness relaxed a little for the moment. Extensive exports of big tree sections for dining-room furniture would, doubtless, be officially frowned on, and Mr. Astor's table will, therefore, probably remain unique.

### Big Sale of American Bicycles.

A FIRM doing business in the Produce Exchange, this city, and London, has recently closed a contract for 10,000 bicycles for shipment to Europe, deliveries to be made monthly during the season of 1898. One shipment has already been made. This is said to be the largest transaction of the kind in the bicycle trade that has transpired for more than a year past, and indicates that the American wheel is fast demonstrating its value abroad and is entering upon the widest popularity.



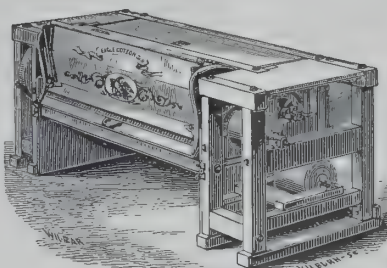
# EAGLE COTTON GINS.



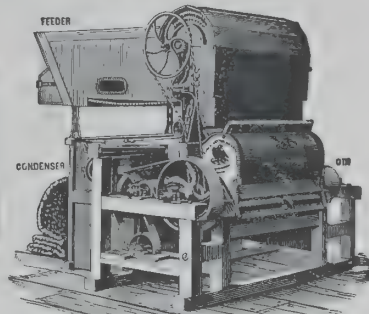
These Gins enjoy a BETTER REPUTATION THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are PREFERRED to all others made, on account of their STRENGTH, SIMPLICITY, DURABILITY, the amount and EXCELLENCE of the work they accomplish, and the RAPIDITY of their operation.

For further details, illustrated Catalogues will be furnished on application.

Eagle Cotton Gin Co. { FORMERLY Bates, Hyde & Co. } Bridgewater, Mass.



Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser.

## COFFEE MACHINERY.

The Monitor Coffee Separator and Grader

Will make clean separations and grade in one operation.

The Monitor Coffee Milling Machine,

The most perfect miller for coffee ever offered. It will do the finest work on tender as well as hard coffees, and do it without waste or breakage.

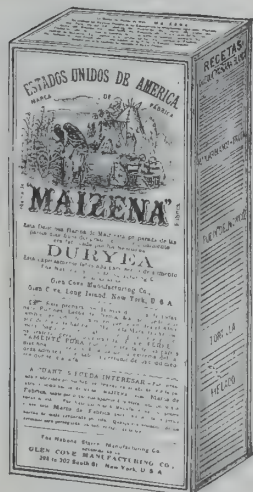
These Machines are in successful operation in many of the largest Coffee Houses in this country, and are well worthy of investigation by Handlers of Coffees.

Can be bought direct from manufacturers or through any reliable exporter.

HUNTLEY MFG. CO., Silver Creek, N. Y., U. S. A.

IS SUPERIOR TO "CORN STARCH," "ARROWROOT," "SAGO," ETC.

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This is a brand for a preparation from the choicest parts of Indian Corn, or Maize, making a healthy and nutritious article of food, and a most

**DELICIOUS TABLE LUXURY.**

ITS PURITY AND DELICACY ADAPT IT TO BEING USED IN A GREAT VARIETY OF EXQUISITE DISHES

ENCOMIUMS TO ITS MERITS:

LONDON, 1862. "Supremely Excellent."

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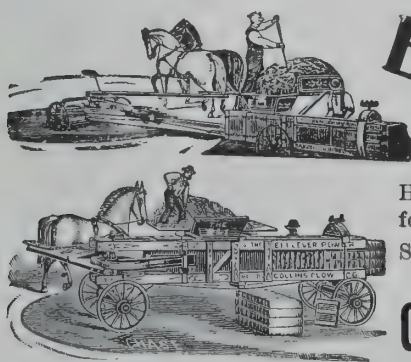
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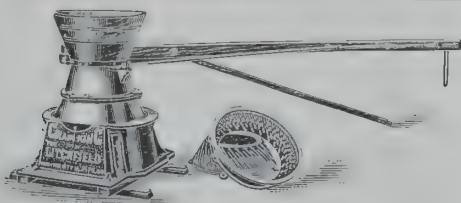
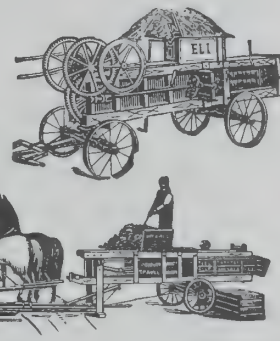
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Hay and Straw Presses  
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**THE FARMER'S GRINDER—The Litchfield Grain King Grinder.**

Made expressly for the farmer to be run by horse power, requiring no separate horse power. Horses attached direct to machine. Grinds all kinds of small and large grains at from 1 to 300 bushels in 10 hours. Price low. Thoroughly warranted and guaranteed. This machine is for grinding for stock and domestic animal feeding. Grinding burrs warranted for five years against wear. Two sets of burrs with each machine. Thoroughly crated. Full direction for operating sent with each grinder. Order through any export house.

**THE LITCHFIELD MFG. CO.,**

**Webster City, Iowa, U. S. A.**

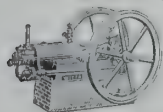
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Built in Parts like a Steam Engine.

Will run in any place or altitude.  
With the electric igniter we can use any grade of gas or liquid fuel.

Fully warranted. No risk. Up to date. Economical on water and Fuel. Catalogue J.

**WITTE IRON WORKS CO., 1218 Walnut Street, Kansas City, Mo., U. S. A.**





### Some Recent Exports of Railway Supplies.

A WILMINGTON (Del.) firm is shipping its last consignment of five sleeping cars to the Argentine Great Western Railway Company, in Argentine Republic, South America. The cars are finished inside in quartered white oak and walnut. The outside sheathing is of teak and the under frames are of steel. The interior arrangement of the cars is partly the American plan of upper and lower berths as in Pullman cars, and partly on the European plan with single and double compartments.

A Bloomsburg (Pa.) car company has just booked an order from the Orange Free State Railway Company for 100 gondola and fifteen passenger cars. These passenger cars will be similar to those used in this country and are said to be the first of the kind built in America for use in Africa.

The Imperial Government Railways of Japan have recently placed an order with the Carnegie Steel Company, Limited, for 30 miles of 20-pound rails.

A large shipment of locomotives will soon be made for Helsingors, Finland. It is expected that the shipment may be made via Hull. In shipping circles it is said that this will be one of the largest shipments of locomotives that has left this port recently. The present shipment is for the great Trans-Siberian Railroad, and the cargo will be discharged in the Gulf of Finland. Americans will put the locomotives together, after which skilled Russian mechanics will take charge of them.

### Some Good Missionary Work for American Furniture.

MR. HENRY C. CARPENTER, the American Consular Agent at Fürth, Bavaria, tells a good story of an effort on his part to introduce American furniture into his district. Convinced that American furniture was greatly superior to any on the market, he interested himself to induce a prominent manufacturer of furniture to buy American furniture. The latter refused to consider the subject for a long time, being afraid that no one would want the goods and that they would be left on his hands after he had paid for them. The Consul kept at him, broaching the subject every time that he met him for a whole year. Finally, meeting the manufacturer on the street one day, he was surprised and delighted to be given the following information: "Well, I am in the American furniture business. I thought a good deal about what you said, and finally I ordered a few pieces, among others two roll-top solid oak desks. They arrived yesterday, and before night I sold both the desks, and this morning I have ordered fifty more. I am going to stop manufacturing German furniture and put in a large stock of American goods."

Obviously the result was satisfactory, not only to the Consul and the American manufacturer, but to the dealer and his customers as well.

### Influence of Climate an Important Factor in the Success of an Interesting Business.

TWELVE years ago a gentleman started in Philadelphia a small plant for the making of blue print paper for photographic use. He was an ardent amateur photographer and was unable to buy a paper coated with the blue solution which was suitable for photographic work. Every grade which was on the market was on coarse, impure paper which was only suitable for architects' use. It was for this reason that the process for making pictures in blue fell into disfavor and was decried by the photographers as worthless.

The first plant established was opened under difficulties. First the paper used was unsatisfactory. After considerable trouble the proper paper was secured, and then the chemicals were found unsuited to the delicate effects absolutely necessary in photography. This was soon remedied and the plant started up with a capacity of 100 small packages of two dozen sheets a day. Extensive and costly advertising in the technical publications all over the world followed. The repugnance of the photographers was gradually overcome and the demand for the paper grew. Agencies were established in China, Australia, India, Siam, Corea, as well as most of the continental countries, and the output of the factory increased in proportion. But there was ever present a difficulty. The paper would not keep as long as was desired. It required years of experimenting to determine the cause. It was on account of the damp, humid atmosphere of Philadelphia.

A year ago the weak spot in the business was discovered and no time was lost in correcting it. Experiments were made in Texas, New Mexico, Southern California and Colorado, and it was found that the climate of Denver was best suited to the business.

The technical advantage of Denver over Philadelphia is readily explained. It is desirable to have the chemical solution with which the paper is coated lie

on the surface. Being quite thin it has a tendency to sink into the fibre and this is prevented in a great measure by the paper being absolutely dry when coated as well as the quick evaporation of the surplus moisture afterwards. Then, in packing it is absolutely necessary that the air be dry. The paper is carefully protected against moisture when shipped to Australia and similar countries, but any "air wash" or dampness introduced in the original package is fatal to its keeping qualities in tropical countries, and the reports received since the Denver product has been shipped show that the keeping qualities of the product have been more than doubled.

The firm holds the government contracts for supplying blue print paper to the governments of many countries and the demand is simply enormous. A short time ago a cablegram was received from Siam complaining that there was delay in the shipment of the last order and doubling an order then on the road. The paper is used by the military and naval departments very extensively in the publication of maps and charts as well as in the making of prints from drawings of a private nature which are never printed publicly. Such drawings are only made in small numbers and the expense of printing in the usual way would be prohibitory.

At present the firm is working its machinery up to midnight every night and still the orders are nearly 50,000 packages behind. Its total output in roll paper alone is about five miles a day, besides 2,500 sheets of 20x24 inches in size.

### American Marine Machinery.

THE San Francisco *Call* recently contained the following: "The Japanese seem to have come to the conclusion that American built ships are equal to any in the world, and one of the largest of the Japanese navigation companies has evidently become convinced that we build marine engines equal to the best. The Tokio Navigation Company, which owns and operates a large number of launches and small craft in Asiatic waters, formerly equipped all their boats with engines and machinery of English and German manufacture. Not long ago they consented to give American engines a trial, and ordered several of a firm in this city. They must have given satisfaction, for the number was increased, and the company now have eleven engines which were made in San Francisco in their service. A few days ago another order came for six more, and accompanying the order was the statement that the American engines and machinery had been found so much superior to those of English and German manufacture that the company had decided to remove all the latter from the boats and substitute machinery made in the United States."

### A Magnet That Will Lift Red-Hot Steel.

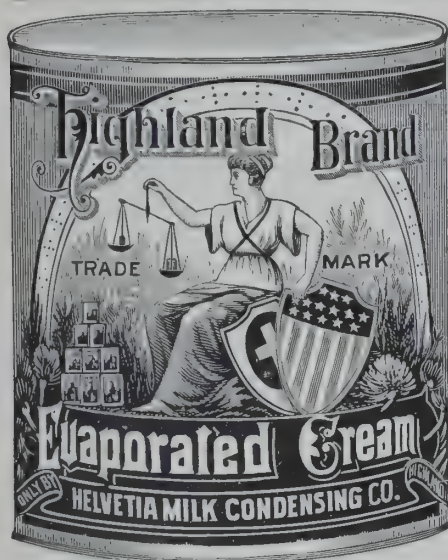
AT the plate mill of the Illinois Steel Company may be seen any hour one of the marvels of practical scientific achievement, namely, a magnet that will lift five tons of red-hot steel, and not only that, but a magnet that will pick up half-a-dozen huge steel plates and drop them one at a time, with perfect regularity, quickly and quietly. One of the company's magnets is especially designed for handling the hot plates and ingots of steel, no difficulty whatever being found in handling a 6,000 or 8,000 pound ingot at a low red heat. As a labor-saving apparatus these huge magnets are declared to be beyond comparison, working swiftly and silently and saving an immense amount of time; in fact, the limit of their speed of action has never yet been discovered, because it has never been considered wise to test them to their fullest capacity, the ordinary every-day rate of speed being found sufficient to fulfill all requirements. But, previous to the introduction of the magnet, the work which it accomplishes required a far greater expenditure of time and more men and machinery, nor was the work ever done so efficiently.

### American Cotton in India.

NOT only is the United States shipping hardware and Manchester goods to England, but recently American cotton has been shipped to Bombay, concerning which shipment the *Pall Mall Gazette*, under the head of "Carrying Coals to Newcastle," says:

"The purchase of American cotton for Bombay is a novelty that is deserving of notice. It has been brought about by the low price of the American staple as compared with that of the intrinsically inferior broach. It is well for the Indian ryot that his country is rather far removed from the United States, otherwise, in a productive year in this last named land, he would find himself deprived of all return upon his investment and his labor. It is pointed out that the comparatively high rates for Indian cotton are not due to any anticipation of small harvests, for as a fact the yield promises to be 150,000 bales greater than was the case last season."





**SIMPLY MILK,** as pure, rich and natural as it is obtained from the cow, treated with neatness and cleanliness, reduced by evaporation to a cream-like fluid and freed by sterilization from all possible germ life. Such is

## Highland Evaporated Cream.

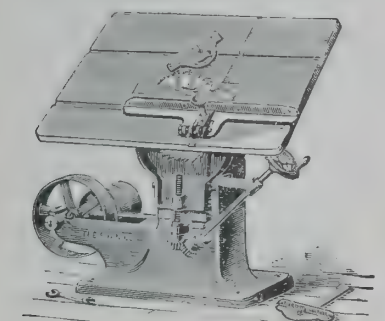
As it is not combined with cane-sugar or any other foreign substance, and as it may be readily diluted with water to any desired strength, it fills every purpose of either fluid milk or cream. It is particularly valuable as food for infants and invalids. It is attractively labelled. It never thickens or spoils while sealed in the can. In the open state it keeps sweet from 12 to 24 hours longer than fluid milk.

GOLD MEDAL by Universal Exposition at Paris in 1889.

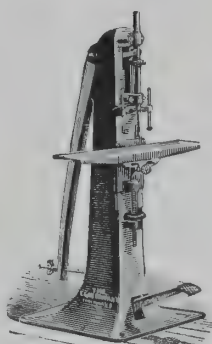
MEDAL and DIPLOMA by World's Columbian Exposition at Chicago in 1893.

Send for prices and particulars, either direct or through your commission house.

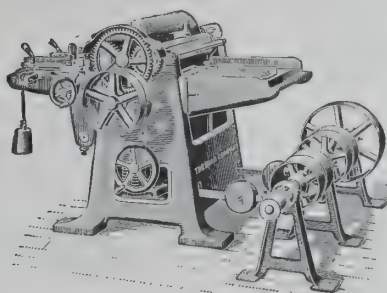
**HELVETIA MILK CONDENSING CO., Highland, Ill., U. S. A.**



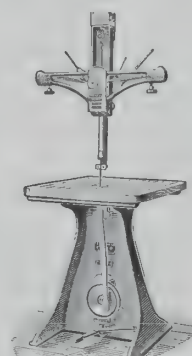
No. 1 Variety Saw.



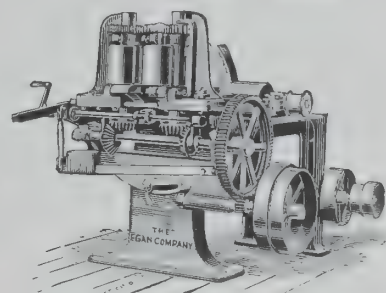
Foot Mortiser.



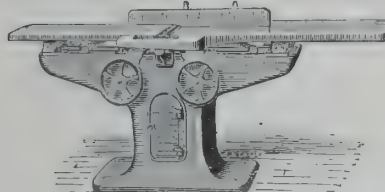
No. 2 Planer, Molder and Molder.  
Planes 24 inches wide, 6 inches thick.  
Molders 12 inches wide.



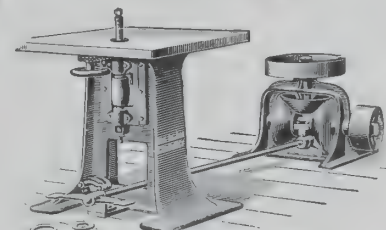
No. 2 Scroll Saw.



No. 2 24-inch Circular Resaw.



No. 2 Hand Planer.



No. 2 Single Spindle Priezer.

## STANDARD WOOD-WORKING MACHINERY.

Parties contemplating its purchase should investigate our line and obtain our prices before placing their order elsewhere. Send your orders direct to us, or, if through a commission house, specify genuine "Egan Machinery," and insist on having it. Illustrated Catalogue, in Spanish or English, free.

164-184 W. Front St. **THE EGAN COMPANY,** Cincinnati, Ohio, U. S. A.



## HIGH-GRADE LEATHERS FOR EXPORT.

### OOZE CALF.

A very soft leather in unfadable colors, peculiarly adapted for wear in warm countries.

Both of the above leathers are especially suited for shoemakers in the Colonies and Mexico.

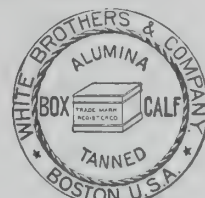
Send for full information direct or through your commission house.

**WHITE BROS. & CO.,**

### BOX CALF.

A bright-finished black leather of extraordinary wearing qualities. Never hardens or cracks.

**BOSTON, MASS., U. S. A.**



## Pike's BOX CALF Polish

IS THE ONLY PREPARATION MANUFACTURED FOR POLISHING BOX CALF SHOES.

Send for quotations, Catalogue "D."

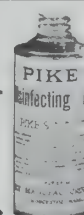
**PIKE MANUFACTURING CO.,**

## Pike's Disinfecting Fluid

THE MOST RELIABLE CLEANER AND DISINFECTANT ON THE MARKET.

Send for quotations, Catalogue "J."

**Worcester, Mass., U. S. A.**



## JAMES HILL MFG. CO.

PROVIDENCE, R. I., U. S. A.

Manufacturers  
of

Write for Catalogues "O" and "P."

## THE HASTINGS & McINTOSH TRUSS CO.

Established 1872.

Successors to

THE HASTINGS TRUSS CO.

224 SOUTH NINTH STREET,  
PHILADELPHIA, PA.,  
U. S. A.

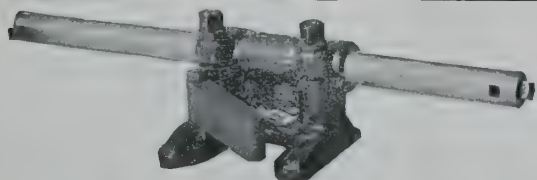
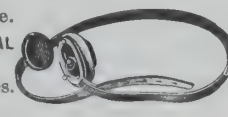


## Manufacturers of all kinds of Indestructible TRUSSES,

Hard Rubber, Elastic and Leather-Covered  
Abdominal and Uterine Supporters, Shoulder Braces, Crutches,  
Elastic Hosiery and Body Belts.  
For Home and Export Trade.

Sole Makers of the CELEBRATED DR. McINTOSH NATURAL  
UTERINE SUPPORTERS.

We solicit orders through export commission houses.  
Send for Catalogue and Price Lists.

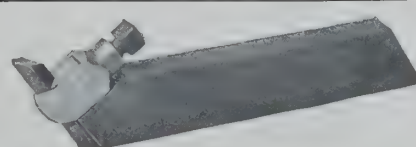


## The "Hugh Hill" Tool Holders,

PATENTS APPLIED FOR,

FOR TURNING, PLANING, BORING AND  
KEY-SEATING METALS.

**THE HUGH HILL TOOL CO. Anderson Ind. U. S. A.**



SEND FOR CATALOGUE





UR advice to dealers is to handle Bicycles that are mechanically correct in design—those that have all up-to-date features—no fads, but practical, new improvements that benefit both wheel and rider. Such are.....

**FRAME.**—Best quality of weldless steel tubing is used. Main frame, 1½-inch; head, 1¼-inch; lower rear stays, ¾-inch, D shape, tapered to ½-inch; upper rear stays, ¾-inch.

**FRAME CONNECTIONS.**—Flush joints.

**SPROCKETS.**—Steel detachable, 20, 22, 24 and 26 tooth front; 8, 9 and 10 tooth rear.

**HANDLE BARS.**—Steel adjustable.

**WHEELS.**—28-inch, fitted with steel piano wire swaged spokes.

**RIMS.**—Wood or steel.

## Imperial Wheels

REGISTERED TRADE MARK.



**BEARINGS.**—Disc adjusting, made from best tool steel, scientifically tempered and carefully ground to remove any roughness caused by tempering.

**BALLS** are kept in place by ball-retainers, which, in connection with felt washers, serve as dust shields.

**OIL CUPS** are provided, which convey the oil direct to the bearings.

**HUBS AND CRANK-HANGER.**—Barrel pattern.

**WHEEL BASE,** 43½ inches.

**WIDTH OF TREAD,** 5½ inches.

**CRANKS AND SHAFT.**—Two-piece, joined in center.

**FINISH.**—Black, maroon or green, plain or striped and decorated.

**PEDALS** are made rat-trap, so constructed that rubbers can be attached.

**CHAINS.**—Superior make, "B" block pattern, centers and pins hardened.

We also make **HIGH-GRADE TANDEM**s and **JUVENILE WHEEL**s.

### LIST PRICES:

IMPERIAL MODELS, Nos. 38 and 39, - \$75 each. | IMPERIAL JUVENILE MODELS, 5 and 6, - \$40 each.  
IMPERIAL MODELS, Nos. 58 and 59, - 60 each. | IMPERIAL TANDEM, - - - - - 100 each.

Floor space occupies five and one-half acres. Capital invested in the manufacture of Bicycles, 800,000 dollars. Business established in 1869.

**Special Discount to Reliable Dealers.**

Correspondence solicited.

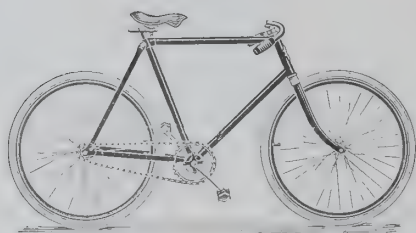
**AMES & FROST COMPANY, "A" CHICAGO, ILL., U. S. A.**



## Our Tribune Bicycles

## THE BLACK MFG. CO., ERIE, PA., U. S. A.

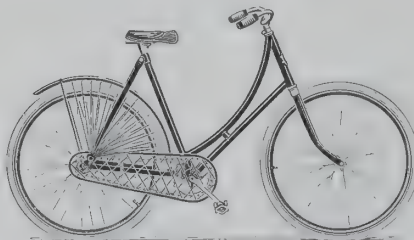
are known the world over for their excellent finish and reliable quality.  
Write for export prices. We deliver our machines properly boxed, freight prepaid, to New York City.



Tribune Model 33. Price, \$50.00.

Model 33 is a bicycle of excellent quality and finish, and far superior to many machines listing at higher price. The frame is weldless steel tubing of best quality, built in two heights, 23 and 25 inches; wheels, 28 inches diameter; gear, 73; cranks, 7 inches. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, gold striped, nickel trimming. Weight, about 23½ lbs.

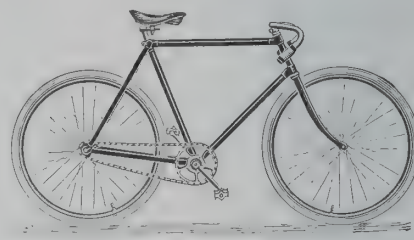
**ARENA MODEL M.** Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 34. Price, \$50.00.

Model 34 is practically the same as Model 33, excepting that it is built with drop frame, 20½ or 22½ inches, for ladies' use. Weight, about 24½ lbs.

**ARENA MODEL L** is very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.

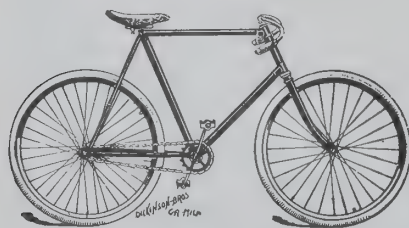


Tribune Model 350. Price, \$75.00.

Model 350 is built for road racing and for all purposes where a light wheel is desired. The frame is built in 23-inch height only. Drop to hanger, 2½ inches; 7-inch cranks; Tribune special single-tube racing tires. Weight, about 21 lbs. Finish, black, gold striped.

**We build also a large variety of higher-priced wheels, including TANDEM, TRIPLETS, ETC.**

Handsome illustrated catalogue describing our full line, **MAILED FREE.**



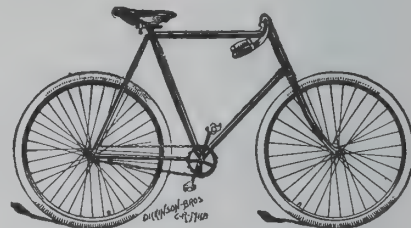
Halladay Roadster, \$100. Discount, 45 per cent.



Lady Halladay, \$100. Discount, 45 per cent.



Lady Aetna, \$75. Discount, 50-5 per cent.



Aetna Roadster, \$75. Discount, 50-5 per cent.

## MARION CYCLE COMPANY,

MARION, IND., U. S. A.

The Largest and Most Complete Line of Bicycles made in America.

## Halladay AND Aetna Bicycles

**Strictly of the Highest Grade.  
Absolutely Guaranteed.**

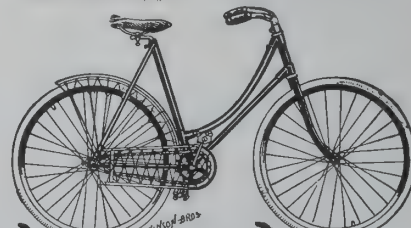
Prices quoted with discounts are our **BEST** and cannot be beat for quality offered. Can refer to largest dealers in America. Complete line for reliable service. Orders accepted through reliable commission houses. Mail exact copy of order direct to us. Direct orders must be accompanied by Draft on New York or San Francisco. All goods carefully boxed for ocean shipment, F. O. B. New York; or delivered San Francisco or New Orleans, \$1.00 net extra per machine. Send for Art Catalogue mailed free.



26-inch Boys' Aetna, \$50. Discount, 40 per cent.



24-inch Girls' Aetna, \$40. Discount, 35 per cent.



26-inch Girls' Aetna, \$50. Discount, 40 per cent.



24-inch Boys' Aetna, \$40. Discount, 35 per cent.





### Chainless Bicycles.

THERE is much to warrant the belief that the word "chainless" is in the near future to be used to conjure many dollars out of the pockets of credulous and oversanguine wheelmen. It will be very proper for all to remember, even if they have to exert themselves a little to keep the fact in mind, that no loud and persistent iteration of this magic word does really effect any actual deterioration of the now almost universal chain and sprocket. The chain is not a bit worse, is as good in every particular as it was before the chainless din began to be heard. We are saying not a word here as to whether some of the novel chainless devices are any better, or as good as, or not as good as the chain-driven wheel, but we merely wish to insist that the term chainless is not necessarily an adjective which guarantees superlative excellence, or, indeed, carries the slightest presumption of improvement. Chainless is a negative term, and means simply, just as crankless or tubeless might mean, something different in style of construction or in means of propulsion. The chainless wheel being simply something different, it should be examined and tried upon that basis. The fairest of fair play is surely enough to accord it. Superiority of service will not eventually be determined by nomenclature, however it may sound at the beginning. The makers of wheels have generally, and most successfully, striven to produce in every detail the most excellent and reliable machine that man could imagine, and have indeed gone far beyond what those best informed would, a few years ago, have dared to hope for. We may be assured that now that the chainless feature is employing their best talent, both in designing and in manufacturing, the product will be at least worthy of most respectful consideration, as it must also invite all honest criticism.—*American Machinist*.

### Good Bicycles and Bad.

THE tremendous influx of poorly constructed cycles in response to the cry for cheapness, and the unduly large proportion of breakages resulting from their use, has distracted attention from what should be one of the prime requisites of a thoroughly satisfactory mount. In the present state of perfection to which the art has been brought, it is not requiring too much to insist on an almost absolute freedom from breakages of all kinds. If we take a roadster machine, weighing, say, twenty-five or twenty-six pounds, fitted with brake, good-sized tires, comfortable saddle and other rational equipment, we have a right to say to the maker that as we have not limited him in the matter of weight, and there is now absolutely no part of the machine that is in any way experimental, we should receive assurance that no part shall fail to perform the duty required of it, normal conditions and reasonable care in riding being promised on our side. We do not mean that in an output of thousands of machines no break should occur, because that would be expecting the impossible; but if something very near this is not attained there is a screw loose somewhere.

If we take, say 500 machines that are sold in a certain territory, and make an exhaustive study of the happenings for a season, ample data would be obtained upon which to decide whether the cycle in question was a thoroughly satisfactory one. Beginning with the most important part of the machine (as far as the purposes under discussion are concerned), and the one that should give the least trouble if properly constructed—the frame—it is within bounds to say that if more than one or two frame breakages are recorded, a bad mark must be placed against the maker, breakages resulting from accidents, foul riding and similar causes not being considered.

The most prolific causes of frame trouble are the use of tubing of such a light gauge that it is necessary to strengthen it with reinforcement after reinforcement, opening the door to all sorts of chances of wrong doing, the use of connections of insufficient strength and lack of care in brazing and thoroughness in inspecting. Everything of this nature should be eliminated. The same remarks apply to forks, which should neither break nor bend without sufficient cause, and it is better to build them absurdly strong than to take any risk, especially as the difference in weight between the strongest and the weakest is very small. As a frame or fork breakage may endanger life, they should be so

rare as to be almost unknown, and this can be accomplished without any addition of weight.

If we turn to the less serious, but quite as annoying, mishaps—breakage of handle bars, cranks, chains and rims—the same watchfulness should be taken to see that they are reduced to a minimum. First class drop-forged makers can turn out cranks that will not break—or so rarely that the proportion is infinitesimal. Of course, if special designs are given them, the cycle manufacturer must see that there is sufficient metal there, and that it is properly distributed. Good chains, of sufficient width will not break if the sprocket wheel teeth are cut to fit them; and the reliability of handle bars depends entirely upon the size, gauge and quality of the tubing employed, with the addition of proper care in the preparation of the bar. In the matter of rims, the cyclemaker has less responsibility; there are good rims and bad; cheap rims and dear; and the proportion that go wrong, even of the best makes, must necessarily be greater than with the other parts discussed. Still, even there, if more than a dozen or so rims should break in the 500 machines, there is something wrong, and an investigation should be made.

The small parts—cups and cones, axles, bolts and nuts, etc.—are not likely to give much trouble if the other parts of the machine are up to the standard outlined above. Spokes should not break. This is rather a sweeping assertion, in view of the large number of spokes that do break, and of the efforts to supplant the regulation hub flange with something that will not break spokes. Yet we speak by the book when we say that a combination of the best spoke and rim obtainable (a spoke of seventeen gauge blade and fifteen gauge butt, for instance), with proper drilling of spoke-holes and expert assembling of the wheel, will absolutely do away with broken spokes. Furthermore, it will obviate the necessity of frequent truing of the wheel, so noticeable where cheap rims are used.

There are a number of makers in this country whose machines would emerge triumphant from such a series of tests as has been outlined. A number of others (many of whom are considered to turn out good work) would ridicule the idea of submitting their machines to such a test, knowing full well that they would fail to meet it. The cycles built for the cheap trade go to people who know nothing about them, and they naturally suppose that other riders have the same trouble as themselves. In this belief the impression is deepened by the sight of mishaps that befall presumably high-grade machines, while they know nothing of other riders who do not know what trouble is. If the lines could be more tightly drawn between the good wheels and the bad, the standard of comparison being the proportion of breakages, it would be better for the entire trade, as riders would learn to know a machine that was worth a good price from one that was not.—*The Wheel*.

### Two Simple and Useful Pedal Improvements.

A NEW YORK firm has recently placed upon the market two little inventions that should be ready sellers in every store dealing in bicycle accessories. One is a pedal rubber designed to fit over the teeth of rat-trap pedals so as to prevent them from wearing out the soles of the rider's shoes. The other is a pedal end protector for preventing the cutting or nicking of shoes. Both are so useful and practical and yet so ridiculously simple that the wonder is they were not brought out long ago.

The pedal rubbers are molded over a metal plate, which prevents their being cut by the rat-trap teeth. They will fit any pedal and can be attached or detached in a second, although they cannot be pushed off by the foot. The end protector should prove particularly desirable for ladies or for men who wear light shoes.

They are marketed at a price that leaves the dealer a snug profit if he offers them to his customers at the popular price of 25 cents.

### Double-Action Air Pump.

COMPARATIVELY few improvements or departures in tire inflators have been made during recent years, one of the most notable being the double-action pump, a new model of which bears substantial evidence of perfecting. In this pump the outlet nipple is located at the top of the cylinder, thus avoiding necessity for stooping to attach the connection to the tire and enabling this to be done while the tire-valve is at an angle. The valves of the pump are so made, too, that it gives a continuous flow of air. There is no lost motion, so to speak; it injects air on both the up stroke as well as the down. The pump is supplied with a connection that will fit any valve having an outside thread, but other connections, when desired, are furnished without extra charge.



### More About Bicycle Machinery in England.

THERE is a good deal of lively correspondence going on just now in the English trade press about the widespread adoption of American machine tool by the most progressive manufacturers. This is from a letter to *Engineering* signed "A Machine Tool User":

"The 'traveller from the States' offers machine tools of a class such as are not produced in Great Britain. What the cause for this may be I need not stop to inquire; it may be the fault of the trade-unions who bar labor-saving tools, or it may be the fault of the masters who have not the ability, or are too much occupied with other things, to push their business in this direction. As an instance, I will take an industry with which I have no connection—the bicycle trade. At the present time thousands and thousands of pounds are going to America for automatic tools to make bicycles. This is not because bicycle makers hate their own countrymen, but because they positively cannot get these ingenious and beautifully made machines at home. The American makers are so overstocked with orders that they have to keep their customers waiting—in fact, the cycle trade is positively crying aloud for machinery; makers are in despair because they cannot get it for their Spring order work, and yet England cannot fill the gap—no, not even Manchester! Yet the cycle had its origin in England, and was a large industry here years before it was much more than thought of in America."

### American Manufactures in Australia.

THE *Post Intelligencer*, of Seattle, Washington, gives some very interesting statistics regarding the growth of American exports to Australia.

A few years ago we had no trade in doors, window sashes or blinds with Australia, but it last year amounted to \$571,860. Until quite recently the English makers of bicycles have had the Australian markets practically to themselves, just in the same way as they had the machinery and farm implement trade in their hands. In 1893 the value of agricultural machinery sent from Great Britain to Australia was of the value of \$235,000, but two years later, notwithstanding the increased population, the total had fallen to \$150,000.

Now the American trade in bicycles has reached the great sum of \$530,339 in a year and is steadily increasing. Last year we exported \$405,493 worth of agricultural implements, which is \$100,000 more than six years ago. The increase in cotton manufactures since 1889 was from \$26,962 up to \$202,895.

These figures come from American sources, but they are amply confirmed by the report of a British agent as to the rise of the American trade in Sydney and Melbourne. Our goods are gaining ground in tools, especially in axes, saws, shovels and files, and in fencing wire and ammunition. This agent says:

"Take an American hammer, brace, saw, axe or hatchet, and its equal cannot be bought outside of America for any money. What English maker will turn out electro-plated ware, such as cruets, butter dishes, etc., anything like the American goods? In spite of years of endeavor to turn out the right article by British makers, all our hammers and carpenters' tools are still from America, while their plows are steadily ousting the old long-breast implements."

Only a short time ago a letter appeared in the London *Times*, written by one of the leading Australian merchants, in which he warned England not only of those facts, but also that the trade in watches had passed to the United States. Incidentally, he notes that prices are always quoted in the currency of the country to which the letter is going. The supplying of invoices in triplicate is a minor, but important, matter. But, beyond all, the Australian merchant praises the enterprise of the elaborate catalogue upon which the American exporter will print the importer's name, and also give the importer's selling prices instead of his own, so that the catalogue can be widely distributed.

### American Exports to Sumatra and Java.

RECENT developments in the oil fields of Sumatra and Java mean much to the industries of Pittsburg. In fact, those who are at work opening up the new fields are looking to Pittsburg for supplies. Already more than one hundred miles of pipe have been shipped to the other side of the world from Pittsburg. Tubing without measure and all the paraphernalia for drilling wells has been, and is still being furnished by local houses.

Recently a letter was received in Pittsburg telling of the completion of plans for the establishment of a great oil well supply house at Singapore. It is intended that all supplies for both Java and Sumatra fields shall be drawn from this point, and the Pittsburg houses will stock it. The Cramps, of Philadelphia, are at work at present on four immense tank steamers to be used in carrying oil in bulk from the Sumatra coast to the distributing points in Asia. A Pitts-

burg mill is now working on thirty miles of pipe to be used in sending oil to the seacoast from the interior fields.

Up to the present time none of the fields described have yet the facilities for utilizing the by-products of the oil. These form a most important part in the profits of the business in this country, and both of the companies now working in Sumatra and Japan are getting in shape to make use of this refuse. Western Pennsylvania oil refiners manufacture about 125 different things from the by product.

### Automatic Bicycle Pump.

A LITTLE device that may prove quite a seller, especially to druggists (chemists) and others who cater to the bicycle trade without doing repairing, or confectioners keeping supplies, is a bicycle pump which is set in action by dropping a nickel, penny or other small piece in the slot, on the same principle as the now almost universally familiar slot machine.

It does not depend upon electricity, steam, water or any other artificial power, the air being compressed into the tire wholly by the action of the lever, moved by the hand of the rider. The great power necessary to effect the result is secured by an arrangement of mechanical appliances entirely new to the construction of pumps.

The pump is always ready to work, and when placed in front of road houses and inns along the boulevards and bicycle paths in the neighborhood of large cities will save bicycle riders an immense amount of inconvenience and discomfort. It is expected, also, that the machine will be used universally for pumping the newly popularized pneumatic carriage tires.

A company is being formed for the purpose of putting out 10,000 of these machines in the Spring and extending their use, also, to all foreign countries where bicycle riding is in great vogue.

The inventor, a New York newspaper man, has worked for several years on the device to bring it to its present form and has covered the invention with over thirty claims for patents.

The appearance of the pump is not unlike a large flask three feet in height, wholly of metal handsomely painted, with no part of the mechanism showing except the actuating lever. The air hose is fitted with a quick-adjusting connection, fitting any bicycle valve, and which is attached by a single movement of a lever-like clamp.

### Operating Electrically a Klondike Wire-Rope Tramway.

JUST how many people will pour into the Klondike region this Spring to rob its fastnesses of their hidden gold it is hard to predict, but 100,000 is regarded by those who know as a very conservative estimate. San Francisco and Seattle are reported to be thrilling with excitement over the subject, and all kinds of preparations are being made by hosts of people to move into the golden land just as soon as there is the slightest possibility of getting there with any degree of safety and certainty. How to get into the region is one of the great problems, even after one has landed on the bleak and inhospitable Alaska shore. There are four overland routes, as we understand it, from that point, and those by the Chilkoot and White passes are the nearest to the headwaters of the Lewes River, where passengers and freight embark on the long waterway. For the present the Chilkoot Pass remains the most popular of all the routes, as the all-water route through the mouth of the Yukon River is not much patronized; and there will be a great stream of Chilkoot travel this year.

But how to get over the terribly stiff and troublesome Chilkoot Pass has been a difficult question for everybody until recently, when it was decided to erect and operate a wire-rope tramway for the purposes of transportation. A complete American-made electrical equipment is already on the way, and before the Summer is over will be in full operation.

Owing to the ice-bound nature of the region steam will be the prime power, but as there is plenty of coal on the coast the cost of operation should not be high. The distance of transmission is thirteen miles. The line potential will be 5,000 volts, three-phase. One of the two tramways will be driven by the 30-horse power motor twelve miles from the generator, and the other, one mile further, by the 15-horse power motor. In this way the toil of the gold-seekers will be very materially lessened, for one of the well-established facts about the Klondike, outside its undoubted stores of gold, is that the Chilkoot is one of the toughest pieces of climbing to be found on the American continent. Hereafter, anybody willing to pay the fare—and a good many will be—can be swung along the electrically-operated wire-rope tramway, which is but one more graphic illustration of the flexibility and availability of electrical power methods.—*Electrical Engineer*.





# HOWARD CLOCKS AND WATCHES

furnish the standard time for all countries.

Correspondence  
solicited.

THE E. HOWARD WATCH & CLOCK CO.

BOSTON—NEW YORK.

Write us in regard  
to Agencies.

# HOWARD BICYCLES

are the most perfect possible to manufacture.

FOREIGN AGENTS:

Union Boot & Shoe Machine Co., Leicester England.  
Bicycle Export Compagnie, Hamburg, Germany.  
A. Hermann & Co., Paris, France.  
Comptoir Trio, San Petersburg, Russia.



The Best, Easiest-Running and Highest-Grade Bicycles on Earth Are the '98

\$75.00

"SYLPHS."

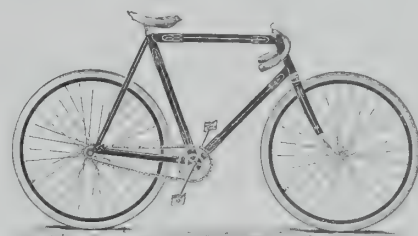
\$75.00

They contain more up-to-date and practical improvements than any other machines, and are acknowledged to be, both at home and abroad, the finest machines made.

They are ESPECIALLY adapted for Export Trade. We are appointing agencies in many foreign countries, and we want to hear from reliable agents in all countries. Our "Sylphs," together with a full line of "OVERLAND" Cycles, are money catchers, and you will make a mistake if you fail to write us before you contract.

"OVERLAND" Cycles, all sizes, all patterns, \$40.00 to \$50.00.

ROUSE, HAZARD & CO., Manufacturers, Peoria, Ill., U. S. A.



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FOR THEIR SUPERIOR QUALITY, DURABILITY AND COMFORT.

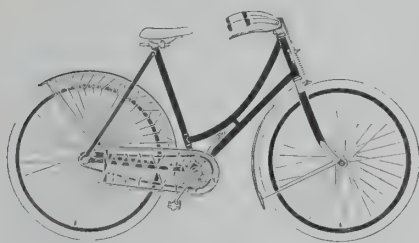
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Send for catalogue showing many different patterns.

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The felt pads are supported on a laced framework of tough but elastic leather thongs.



## OUR WHEELS

are designed to suit the peculiar foreign climate.

THEY ARE STRONG, EASY RUNNING AND ELEGANT.  
STEEL RIMS, FRONT AND REAR MUD GUARDS AND BRAKES OPTIONAL.

List,  
\$60.00.

Discount,  
50 per cent.

Write for special cash discount and catalogues direct or through reliable commission house, with copy of order to us.

LEAGUE CYCLE MFG. CO., - - Milwaukee, Wis., U. S. A.

# IMPERIAL Bicycle Lanterns

ARE FAVORITES THE WORLD OVER.

**WHY?**

They will neither blow out nor jar out.  
They are strong, safe, clean, attractive.  
They produce a large, bright light. Are fitted with fine magnifying lense.  
They are made from the very best material and possess positive merit.

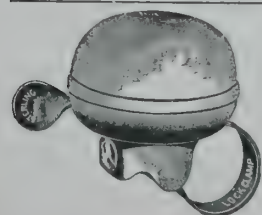
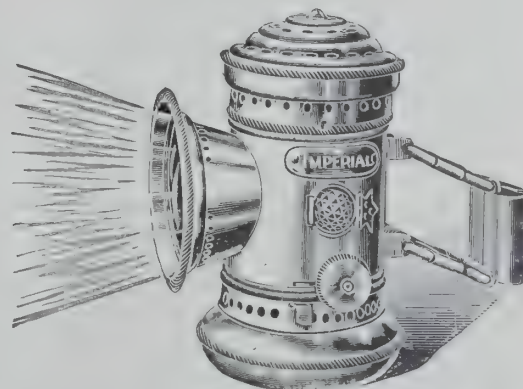
MANY NEW FEATURES.

PRICES INTERESTING.

SEND FOR '98 CATALOGUE,

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THE E. P. BRECKENRIDGE CO., - Toledo, Ohio, U. S. A.



## Sterling Bicycle Bells

ARE THE BEST IN THE WORLD.

Made in all sizes and styles. (32 numbers.) Send for Catalogue "B."

N. N. HILL BRASS COMPANY,  
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## No More Rust.

Our "Three in One" Lubricant  
Contains no Acid.

Prevents Rust on All Metals.

The only perfect Lubricant for Bicycles, Guns, Sewing Machines, Reels, Etc. Never gums or hardens. For cleaning Bicycles or Fire Arms after shooting. It has no equal. It is transparent and clean to use. Correspondence solicited. Send for Catalogue "C." Order through Export Commission Houses in this country.

Manufactured by

G. W. COLE & CO., 111 B'way, New York, U. S. A.



### American Paper Abroad.

THE reports in circulation for some time to the effect that the paper manufacturers of this country are supplying the English Government with the major part of its stationery were confirmed recently by the officials of two of the large paper companies. They said that not only is England a large customer, but Germany and France both purchase quantities of certain kinds of paper from American manufacturers, and that some of this paper is used by all three of these governments. The paper trade of this country has developed so rapidly during the last few years that except in a few grades peculiar to the countries in which they are produced, the United States leads all others in this branch of manufacturing.

Just how long the English Government has been using American paper is a matter of conjecture. The manufacturers here, however, say that large quantities of paper have been shipped to the United Kingdom annually for the last ten years. Nearly all of the typewriters used abroad are of American manufacture, and wherever they are sold the peculiar kind of paper that is made for them is also sold. It was a water-mark in this kind of paper that led to the discovery that the English Foreign Office was using it in preference to paper made at home.

The American manufacturers say there is nothing strange in the fact that the United States is able to compete with the English in their home markets in paper-making as well as in a dozen similar trades. Wages are, of course, 25 per cent higher here than they are in England, and the freight on the product has also to be paid. But the American has the advantage in an unlimited supply of raw material almost at the doors of his mills, whereas the Englishman has to come to this country and buy his raw material from the very American he has to compete with. He then has to ship it home, import nearly all of the various other products required, store these, pay rent on all of them, and finally have them prepared at a dozen different expenses to which the American is not subjected. It is due to these facts, so manufacturers say, that they are enabled to compete successfully in the European market. A prominent manufacturer in discussing the situation gave some interesting facts concerning the trade.

"In the first place," said he, "there are certain kinds of paper that this country never can produce from native raw material. The most important of these are the linen papers made from flax. These are all fine grades. We cannot grow flax here in any quantity, and we would have to import the raw product and then ship the manufactured article back to where we got our supplies. England does this in a good many cases, because she gets her raw material in countries where there are few if any manufactories. When she or any other country has to compete with manufacturing interests that have been in existence for centuries, this competition can be based only on one thing, cheaper raw materials. England has no forests for wood pulp. She is short of straw for the lowest grade of wrapping paper. This country has both in abundance. The American machinery is equal, if not superior, to that in England, so the only thing that the American has to consider is the difference in wages and the cost of shipping paper to Europe. I believe that this difference is offset by the difference in the cost of raw material."

### Electric Lights for the Catacombs.

VISITORS to Rome will be able, in a short time, to view the many catacombs of the Eternal City in the actual light of modern times. Incandescent lamps, charged with electricity furnished by American dynamos, will be used to illuminate the dark recesses that have existed for centuries.

Six dynamos, each one capable of supplying current for 450 lights, will be placed in compartments specially designed for them in the six principal subterranean cemeteries of Rome.

Some months ago a system for lighting the catacombs of St. Callistus was introduced. Its working was found to be satisfactory in every respect, and the persons in charge decided to extend the system to include all the large catacombs of the city.

Each dynamo will be separate and distinct from the others, and, in short, what is known as an isolated lighting and power plant will be installed in the catacombs of St. Callistus, St. Agnes, St. Cyriaca, St. Domitilla, St. Priscilla and St. Pontianus. Each dynamo will supply current for 400 to 500 lamps, and arrangements are also to be made for power to run an electric elevator from the lower tier of tombs in the St. Callistus catacombs, the largest in Rome, to the entrance building on the surface. From sixty to seventy amperes extra will be required for this purpose, and it is probable that a small motor will be installed.

The dynamos will be of 60 kilowatts 125-volt type, and each one is to be

driven direct by an engine at 300 revolutions per minute. Switchboards of Tennessee marble are also to be furnished by an American concern, which has received the contract for the wiring.

It is proposed to wire the area ways in every one of the six principal catacombs, having drop lights fall in front of every row of tombs. A number of lamps will illuminate the crypts in which various revered monks and priests are buried, and extra illumination will be given portions of the vaults in which there is fine painting and fresco work.

Altogether, about \$200,000 is to be spent by the Roman authorities in modernizing this work of the third century.

### One American Railway's Cycle Experience.

D. I. ROBERTS, of the Erie Railway system, in speaking of the transportation of bicycles by that road, said: "We carried 204,305 bicycles during 1897, and this without the loss of a single wheel. Of course, bicycles are inconvenient things to carry, but as to complaints we have none whatever to make.

"Some of our bicycle friends were very confident that our earnings in passenger revenues would be largely increased by the free carriage of bicycles, but I regret to say that this has not proved true.

"We hope to be able to make as good a record in 1898 in the way of prompt handling and delivery of bicycles as for 1897, and if we do we shall be entirely satisfied."

If Mr. Roberts had thought a bit he would not have gone on record as above. The carrying of 204,305 bicycles means that this cycle carrying brought his passenger department just about two hundred thousand more passengers than it would otherwise have had had there been no cycling. That Mr. Roberts himself really thinks something of the kind is plainly shown in the last half dozen words of his interview.

### Export Trade in Gas-Engines.

THE demand for American gas engines abroad is rapidly growing and promises soon to become an important branch of our exports of machinery. An electrical engineer, expert upon gas-engine matters, recently expressed himself as follows:

"There is a big future in the foreign trade of gas-engines; the innumerable uses to which they are applied are alone a recommendation and bound to create a demand. In a country where fuel is high they are mostly in demand. American gas-engines are to-day being extensively used all over Europe. In Paris there are engines of 300 horse-power that were made in this country some time ago. Only a few days since the manufacturers of those engines heard of great saving they were to the parties using them and how highly they speak of them. Any town where ordinary gas is manufactured can use gas-engines to advantage. The principal uses to which they are applied are for pumping and for driving dynamos for small plants. But when it is realized that to-day gas-engines are made from  $\frac{1}{2}$  to 300 horse-power the many uses to which they may be put to are extraordinary. The Central and South American countries are beginning to buy these machines, and it is expected that as their many uses are shown to the people the demand will increase.

### American Rubber Shoes in Germany.

A BERLIN correspondent of *The India Rubber World* reports that the market for American rubber shoes in that country, particularly of unglazed goods, is rapidly extending. Several manufacturers have begun to secure a foothold in the country, and as the quality of their goods becomes better known their popularity is increasing. Ladies' shoes of American make are especially in favor, being lighter and narrower than those placed upon the market by Russian and German firms.

The correspondent visited a large shoe store on the Leipzigerstrasse in whose windows The Boston Rubber Shoe Company had placed a fine display and was assured by the proprietor that no fault whatever could be found with the size and adaptability of American rubber shoes, sizes being sent capable of fitting any German boot or shoe. He learned also that American rubbers could be sold cheaper than those of Russian make. Consequently the German retail dealers, to whom it is a matter of supreme indifference whose goods they sell as long as they sell well and satisfy customers, will in most cases prefer and push the American lines, since upon these they can make the greatest profit.



# BICYCLES!

## "ILLINOIS" Bicycles.

Best bargains offered in Bicycles for 1898.

Spiral Screw Drivers.

Reversible Bit Screw Drivers.

One Hole Hand Corn Shellers.

Waffle Irons.

Serrated Edge Knives.

WE ARE THE WORLD'S HEADQUARTERS  
FOR THESE GOODS.

Paring Knives.

Mincing Knives.

Meat Tenderers.

Can Openers and Hardware Specialties.

SEND TO ANY EXPORTER IN THE UNITED STATES, OR TO US  
DIRECT FOR OUR 1898 ILLUSTRATED EXPORT  
SPECIAL, GIVING NET PRICES.

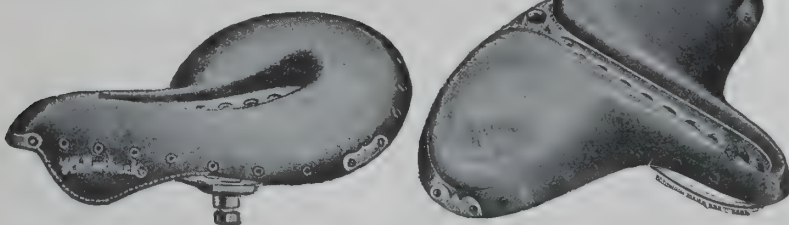
## ILLINOIS CUTLERY COMPANY,

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F. A. HOLLENBECK & CO., - Syracuse, N. Y., U. S. A.

Manufacturers and Exporters of

### BICYCLE SADDLES.



Orders filled through Commission Houses.

Catalogue 3 on application.

Correspondence solicited.

### BICYCLE HANDLE BARS.

Best Nicked over Heavy Copper.  
Made 7-8 Tube Tops.

PRICES, WITHOUT GRIPS, F. O. B. NEW YORK.

Upturned, one doz. lots .....	\$10.50
Drop, one doz. lots....	10.50
Octagon Tube, extra, per doz.....	3.00
"Schinner" Bars, extra, per doz....	1.20
One-inch Tube, extra, per doz.....	1.20
Ram's Horn, one doz. lots.....	11.50
Adjustable, one doz. lots .....	13.50
Anti-Vibration, extra, per doz.....	3.00
Seat Posts, per doz.....	3.60

Any size stems. Discount to the trade on 100 to 50,000 lots.

Chicago Handle-Bar Co., 34 & 36 Market St., Chicago, Ill., U. S. A.

**KNOCKED OUT  
COMPETITION KILLED  
BY OUR PRICES  
GREATEST LINE OF BICYCLES ON EARTH  
THE AMERICAN BEAUTIES**

10—MODELS—10

WINDSORS, NORTHFIELDS, WINFIELDS.

Catalogues for nothing. Write for our confidential offer, which will surprise you.  
In sending orders through export commission houses send us duplicate order.

The BROWN-LEWIS CYCLE CO., 300 Wabash Ave., Chicago, Ill., U. S. A.



## Patee

### '97 Model Now Ready.

Patee bicycles have a world-wide reputation because they are always "up to date" in every particular, and also because only the very best material is used in their construction.



They are built by the oldest and best-known high-grade bicycle men in America, and the '97 model embodies some new and special features that will fascinate wheelmen and dealers instantly.

The one-piece crank shaft and cranks, the thorough dust-proof device, the quality of tool steel in bearings, the manner of re-enforcing, the adjustable bar and manner of locking in the head are all new and special features used exclusively on the "Patee" (our own patents).

Do not contract for '97 without getting our catalogue and prices and seeing sample. It is unblushingly and emphatically the best bicycle in the world for the money, and is guaranteed equal to any bicycle in the world. American list, \$60.00. Liberal discount to dealers. Do not be afraid to write. We want your business and will take pleasure in telling you more about our wheel. Address

**PEORIA RUBBER & MFG. CO.,**  
PEORIA, ILL., U. S. A.

MADE BY  
Peoria Rubber and Manufacturing Co.

### SHREWD BUYERS

are successful business men, consequently well-informed  
dealers are anxious to secure agencies for

## NIAGARA BICYCLES.

Well-made wheels give riders satisfaction and dealers  
profit, which fact accounts for the well-known motto:  
"Once a Niagara Agent Always a Niagara Agent."

Address Dept. H.,

**BUFFALO WHEEL COMPANY,**  
BUFFALO, N. Y., U. S. A.

Agencies arranged in  
unoccupied territory.

Write at once for our '98 Catalogue  
fully describing new models.

## RALPH TEMPLE CYCLE CO.,

204 35TH STREET, CHICAGO, U. S. A.

Best and Lowest Priced Bicycles in America.

Catalogue in English, German and Spanish.  
We export to nearly every country in the world.  
Our machines are complete with good, serviceable  
Breaks and Guards.

WE FIT ANY TIRE YOU ASK FOR.

*Temple*

Our prices include goods, properly  
packed, f. o. b. steamship at New York.

Catalogue, prices and terms cheer-  
fully given. If you want to save delay  
you can send us a sample order which  
we will ship cash against B-L at our ex-  
port prices. Order the price machine  
you want, or a sample of each. We make  
bicycles that sell for \$40, \$50, \$60, \$75.

We can convince you we are the  
people to do business with. Repair  
parts sent with each order without  
charge. As to the reliability of our  
machines we will gladly give first-class  
references from those who sell our goods  
in many parts of the world.



Export price this machine only \$25.00.



### Electric Delivery Wagons in Chicago.

THE electric vehicle is steadily gaining ground and is now entering into practical commercial work. Two electric wagons have been running for five months in Chicago delivering silk goods for a large dry goods house there. It is stated that they have proved so successful that a large number of similar vehicles have been ordered by the same and other houses and are now being built. A few facts in regard to these pioneer wagons may be of interest.

The weight of each wagon is 1,700 pounds, of which 572 pounds is in the batteries. The odometer shows that each wagon has run an average of 37 miles each working day, or a total of 4,810 miles. Much of this has been made over exceedingly rough streets, as any one acquainted with the decayed cedar-block pavements of Chicago can testify.

Each wagon has one  $3\frac{1}{2}$  horse-power motor of the American Electric Vehicle Company's design, dust and water proof. These are geared to the two rear hubs, and a differential gear and hollow armature shaft provide for the difference in rotation of the rear wheels in turning corners. The armature rotates at about 1,200 revolutions per minute when the carriage is at full speed on a level. The maximum speed is 12 miles an hour. The wheels are 34 inches in diameter, both front and rear, and have been equipped with 3-inch pneumatic single-tube tires of very heavy design. These, however, are being changed to cushion tires  $2\frac{1}{2}$  inches in diameter, as it is found that the pneumatic tire gives out quickly in rough delivery work where the vehicle is pounded along over rough streets at full speed.

The batteries are charged at night off the regular 110-volt current from the Edison mains. The charging current is started at 7 to 8 amperes, the 44 cells being of course in series, and toward the end of the charge reduced to 4 or 5 amperes. The company contracts to maintain the batteries at \$50 per year for a wagon of this kind, so that no fear need be entertained by purchasers as to excessive cost in that direction.

A few minutes' calculation will show that an electric delivery wagon is by no means an expensive luxury. These delivery wagons, run by horses, would require six horses each to make 30 miles a day, according to the regular calculations of the teaming companies doing business in Chicago. To make 37 miles a day, therefore, would require no less than eight horses. It is unnecessary to say that the electric vehicle, even where power is high, can be run for less than the expense of feeding, housing, shoeing and renewing eight horses in a large city. Supposing the charging current to cost \$1 per day and the battery maintenance \$50 per year (by contract), the cost for 310 working days would only be \$360. This, of course, does not include attendance during hours of charging and general repairs. At the same time it must be remembered that the horses require more attendance than the electrical apparatus. Furthermore, as matters are at present, the electric wagon, with its illuminated sign, is worth all it costs as an advertisement, even if it were worth nothing for delivery purposes.

### Motor-Driven Printing Presses.

AS was to have been expected, printers have not been the last to avail themselves of the advantages which recent discoveries by the students of electric science have placed at the disposition of industrial enterprise.

The advantage is obvious of a system which renders it possible to locate presses and other printing machinery in any part of an establishment, exclusive of line shafting, and also to run any one press at any time independent of the others. With presses equipped with direct-connected motors, each can be run at any hour of the day or night, with an expense of power proportionate to the work done, instead of that requisite for running a boiler, engine and heavy friction load of shafting and belting.

What such a saving amounts to may be judged by an estimate made by Professor Benjamin, of the Case School of Applied Science, of Cleveland, Ohio. In sixteen establishments whose plants Professor Benjamin tested, there was developed 1,808-horse-power, and of this 979-horse-power, or 51 per cent., was expended in driving the shafts, pulleys and countershafts, while all the machines were idle. There are cases on record in which the loss of power in transmission from engines to machines, through belts, is much higher even than this, ranging from 80 to 93 per cent. of the total power generated.

So direct an appeal to economy as is made by such facts as these has a strong tendency to increase the already rapid process of installation of electric-power plants. Another great advantage of direct-connected motor to the press or other machine is that an accident to the power does not affect the whole plant, as the breaking of a belt or the main shaft causes a complete shut-down until repaired. And this by no means infrequent occurrence very often assumes the proportions of a real catastrophe.—From the *Inland Printer*.

### New Ward Line Steamers.

A CONTRACT was placed on Friday, December 31st, by the New York & Cuba Mail Steamship Company, generally known as the Ward Line, with the Cramps, of Philadelphia, for two new steamers which, when completed, will rank with the finest vessels ever launched from American shipyards. The construction of these vessels is a result of the new Government mail contract, which required that the company provide sixteen-knot boats.

Work has already been commenced on the new vessels, and the first is to be ready for service about October next, the second following later. They will be 5000 register ton vessels, 360 feet long between perpendiculars, or about 400 feet over all; 50 feet beam, with 32 feet depth of hold and 21 feet draught when loaded. They will probably be the most expensive steamers of their size and for their trade afloat. They will resemble in many respects the St. Paul and St. Louis of the American Line, and will, in fact, virtually be ocean liners, with the improvements required for the coasting trade. They are to be twin-screw vessels, and will also have two stacks, differing in this respect from the present steamers of the line. They will have triple expansion engines, four boilers of 5,000 horse-power, giving them a speed when loaded of sixteen knots, this speed to be maintained when in actual service as well as on trial trips. Each will have five hatches and six sideports, thus ensuring rapid handling of cargo.

There will be passenger accommodations on each of the new vessels for about 140 first and second cabin passengers. The cabin quarters will be amidships on the hurricane deck, and each stateroom, which will be 9 by  $6\frac{1}{2}$  feet, will be an outside room with entrances from the interior of the vessel. The second cabin quarters will be aft on the hurricane deck. This arrangement gives up the fore and aft of the vessels to cargo. There will be a smoking-room on the bridge deck, communicating with the hurricane deck without going outside. It is unnecessary to say that the vessels will be equipped with electric lights and that the passenger accommodations will have every improvement, both for safety and convenience, of a modern first-class steamer.

In accordance with the contract with the Government the new vessels are to be serviceable as auxiliary cruisers. They must be of sufficient strength and capacity to carry and sustain the working of a battery of twelve rifle cannon, of a calibre of not less than 6 inches. Special attention will be paid to the protection of the machinery, the coal bunkers being so placed that none of the main machinery will be within 10 feet of the sides of the vessels.

The names of the new steamers have not been selected. The vessels are intended for the regular Cuban and Mexican service of the line.

### A Comparison of Tires and of Pavements.

SOME French experiments on resistance to traction with various tires and on various pavements—a subject of growing interest now that the horseless carriage has come among us—are described by M. Hospitalier in a paper presented to the Société des Electriciens. The trials were carried on, as we learn from *Electricity*, by M. Fonvielle, under the supervision of M. Michelin, with a view to comparing the coefficients of traction of vehicles fitted with iron, solid rubber and pneumatic tires on various kinds of pavements and at different speeds. The figures below give the tractive force in pounds per ton and the speed in miles per hour:

1st. Boulevard de la Seine—Macadam in good condition, hard, dry and dusty:

	Speed per hour, miles,	Tractive Force in Lbs. per Ton—		
		Iron.	Solid rubber.	Pneumatic.
Wind from ahead.....	7.2	59.97	54.01	49.16
“ “ behind.....	7.2	55.78	50.26	45.86
“ “ ahead.....	12.05	75.84	65.92	54.67
“ “ behind.....	12.05	60.85	55.56	52.47

2d. Same boulevard—Macadam in good condition, hard but slightly muddy:

	6.7	60.42	58.43	52.92
	12.2	87.93	78.50	70.12

3d. Same boulevard—Macadam in good condition, but very wet:

	12.8	100.55	93.93	77.18
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Trials on other boulevards developed much the same results, showing the pneumatic tire to be never less than 10 per cent. better than the iron tire, and at times as high as 30 to 35 per cent. better over bad pavements.

### Electric Mower.

ELECTRICITY, says an exchange, is used to destroy weeds in a new device, which can be used on an ordinary mowing machine, one wire of the dynamo being attached to the cutting bar and the other grounded through one of the wheels, so that if the weeds are cut when damp a current of electricity enters each root and burns it as the top is cut.



FRANK MILLER'S  
HARNESS OIL

Preserves and softens the leather, thus adding life.

The highest quality of oil on the market.

ESTABLISHED 1838.

## The Frank Miller Co.

349 & 351 West 26th Street, New York,  
U. S. A.

MANUFACTURERS OF

Blackings and  
Leather Dressings.

The goods mentioned are but a few of our many preparations for leather. Write to any New York Export Commission House for our Complete Price List and Samples.

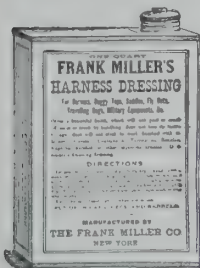
Our Preparations are Uniform in Quality and always give Perfect Satisfaction.

FRANK MILLER'S  
Harness  
Dressing.

Recognized as

"THE STANDARD."

Produces a brilliant jet-black gloss, which will not peel or smut, and to which dirt will not stick.



FRANK MILLER'S

CROWN  
Shoe Dressing.

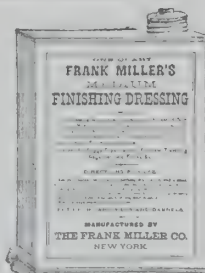
For Ladies' and Children's Black Shoes. Produces a perfect finish, without injury to the finest leather. Each bottle in handsome carton.

FRANK MILLER'S  
MEDIUM

## Finishing Dressing.

For use of Boot and Shoe Manufacturers in finishing new stock, also for restoring old stock to its original fresh and new appearance.

Softens and Preserves.  
Prevents Mould.  
Does Not Scale Off.



## L. C. SMITH GUNS.

ALL BORED FOR  
NITRO POWDER.

Guaranteed never to shoot loose.  
8, 10, 12 and 16 Gauges.

We use Whitworth Fluid Steel, Crown Steel and Damascus Barrels.

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We now put Ejector Mechanism on all our different grades.

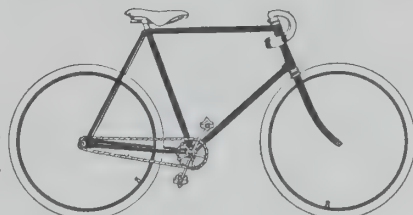
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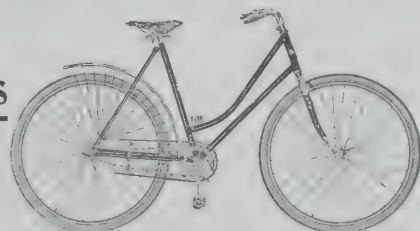
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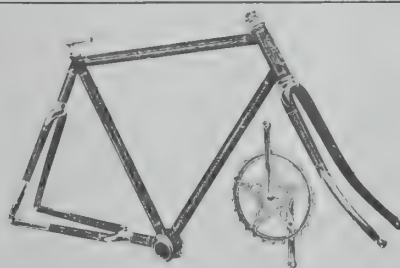
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It is made of the very best material.

It is new and novel and eminently practical.

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It has an eccentric bracket at the hanger which facilitates the adjustment of the chain without using the rear chain adjusters, and is fitted with the one-piece Fauber crank.

The Thor Hubs are used and recognized everywhere to be the best.

The best swaged spokes, 14x16 size, are used.

Laminated or one-piece selected rock-elm rims.

1 1/4 or 1 1/2, 28-inch wheels, drilled 32x36.

The Peacock or Baldwin adjustable chain.

Head set, turned from bar steel, drop forging connections.

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### An Electric Shifting Engine.

THE latest application of electricity to standard railroading presents several interesting features, and in view of the great importance of the subject we feel justified in presenting to our readers a complete account of the appliances in use. The road in question is a short freight road connecting the various steam railways centring at Hoboken, N. J. (a point across the Hudson River from New York), and the numerous steamship docks that line the river front. Naturally the freight business of the road is very heavy, although it is only two miles in length.

The locomotive is similar in general appearance to the giant electric locomotives now handling the entire freight traffic of the Baltimore and Ohio Railroad through the Belt Line tunnel at Baltimore. It is mounted on two four-wheel trucks, each axle carrying a G. E. 2,000 motor, giving the locomotive a total of 540 rated horse-power. The weight on the drivers is 57,200 pounds; the drawbar pull is 10,000 pounds. The locomotive is driven through a single reduction gear of very low ratio. The speed is correspondingly low, and is rated at eight miles an hour when hauling a heavy load.

At each end of the locomotive is an automatic coupler and a small railed platform for the brakeman in charge of the trolley pole. The cab is of iron and resembles a double steam locomotive cab, with a sloping tender shield at each end. Drop windows are set around the four sides of the cab, affording an unobstructed view in all directions to the motorman. A sliding door on each side gives admission to the locomotive. The interior of the cab is lined with cherry and is a spacious and well-lighted room. The fittings are all of polished brass or nickel. On each shield is a headlight; in addition one shield carries a bell, the other a chime whistle. Beneath one of the shields are four packed card resistances, two sand boxes, the compressed air tank and the equalizing air tank; beneath the other, eight resistances, two sand boxes and the motorman's tool box. At one end of the cab is placed a controller of the series parallel type known as the L 2. It contains, of course, the magnetic blow-out, and is arranged to operate the motors either four in series or each two in series multiple. Beside the controller is the air-brake handle and the two valves of the sanding arrangement by means of which the sand is blown by the compressed air under the wheels.

The dimensions of the Hoboken locomotive are: Length over all, 29 feet; width, 8 feet; height over trolley stand, 13 feet; wheel base, 5 feet 6 inches; truck centres, 12 feet 9 inches; weight, 57,000 pounds.

The difference in its operation from that of the common drill engine is immediately noticeable. The electric locomotive responds instantaneously to the movement of the controller handle and starts without jerk or noise, tightening up the couplings uniformly or coupling the cars together so gently that no jar is perceptible.

### Electrical Advance in the Past Ten Years.

WHAT, then, was the condition of the art ten years ago? By comparison with the present status, we may, generally speaking, get some idea of the growth during the past ten years. In thus looking backward, we find that there were telephone exchange systems, but practically no long distance extensions. We also find that in the larger cities and towns arc-lighting circuits for street and store service were in use, employing only the constant current or series system; while to day arc lights of various kinds are worked on several plans or with different kinds of current supply. There were, in addition, a moderate number of electric stations, supplying incandescent lamps, together with a few electric motors. Here and there isolated lighting plants in mills and other large buildings were in operation; but the alternating current, so large a factor in electrical enterprises nowadays, had scarcely become known or applied practically. There were, perhaps, not more than twenty trolley cars in actual service in 1887; and these were of doubtful success. There were no regularly constituted electric railways worthy of the name. The telephone and electric lighting wires were largely over head, and frequently the construction was of the most imperfect and temporary character.

Within the past eight or ten years much has been done in the perfection of thoroughly practical forms of meters and other instruments for the measure-

ment of electric forces and quantities. While such work resembles in its delicacy that demanded by watch mechanism, on the other hand the large station dynamos are examples of the heaviest machine construction. Some of them demand steel castings more than 30,000 pounds in weight. Indeed, in the same electric factory we may find watchmaking tools turning out the fine pieces of electric meters, which may not weigh more than a few grains, and electric cranes handling masses of metal of many tons—parts of the larger dynamos under construction. A few years ago a dynamo was large if it demanded 100 or 200 horse-power to drive it, while now such machines are diminutive when compared with those of 2,000 horse power commonly constructed.

Dynamos are in use at Niagara of 5,000 horse-power capacity. A single one of these would supply more than 50,000 incandescent lights such as are ordinarily used, or would give motion to 500 trolley cars. The period since 1887 has been marked by great extension in electric lighting by both arc and incandescent lamps. Prior to that year, only the largest cities, broadly speaking, possessed any electric lighting service. Now, however, even the smaller towns have their electric stations, their arc lamps for street lighting, and the smaller incandescents for general use. The same wires or mains frequently supply both kinds of lights. The incandescent lamps used in the United States are numbered by millions, and there are several hundred thousand arc lamps besides. There are in operation nearly 3,000 electric light-supply stations; and these, together with isolated electric plants, represent a capital of about \$500,000,000.

It cannot, with truth, be said that electrical arts or industries are still in their infancy, if we are to judge by the perfection of electric manufactures. It has been many years since electrical work could in any sense be regarded as empirical, except by the uninformed. Few of the older arts have possessed or do possess the means for such exact measurement or research; few, indeed, are based upon simpler laws of action. Had it been otherwise, the rapid progress which has characterized the past twenty years would have been impossible. A striking feature of electrical energy is that it may be readily applied to widely varied work.

A few instances of this may be given. The large electric lighting stations in our cities not only supply from the same mains, at the same time, electric current which lights both arc and incandescent lamps indiscriminately, but the system carries also a large load in electric motors employed for such service as running elevators, driving ventilating fans, supplying power for pumping, and driving machinery in shops of all kinds. The same mains supply current for charging storage batteries, for heating metals for welding or working, for warming rooms by electric heat, or for cooking by electric heaters. The physician or surgeon draws upon the same system for current for the treatment of disease, for galvano cautery, for electrolysis, and for the generation of Roentgen rays.

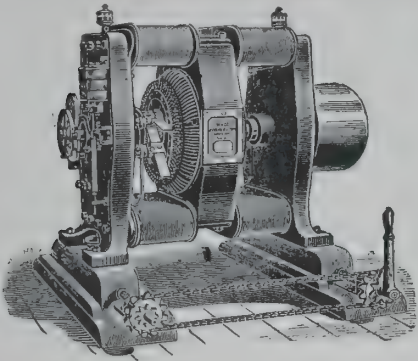
Another example is found in a modern warship, which may embody an electric plant for working its incandescent lights. The same machinery supplies the searchlight, which is essentially an arc light of great power. There are also electric cranes and hoists, turret-turning and gun training apparatus, motors for ventilating fans or for forced draught in the boiler furnaces—all depending on the same supply. In the large work of to-day, the general practice is to build the dynamo directly upon the shaft of the engine which drives it, or upon the water-wheel shaft, as the case may be. This avoids loss in belts or other forms of gearing.—Abstract from article by Elihu Thomson in *The Forum*.

### Can Wireless Telegraphy Succeed Commercially?

ACCORDING to *The Electrical World*, the prospects for the practical success of the system of wireless telegraphy invented by Signor Marconi, which has already been described in these columns, do not seem bright. There is doubtless a great deal about the idea of "wireless telegraphy" that appeals to the popular imagination and makes it a fruitful theme for discussion at the hands of superficial newspaper reporters. The caution of the conservative electrical paper may therefore be worth considering by those attracted by the alluring prospectuses of the promoters of the new invention. *The World* says:

"First of all, there can be no suggestion that he owns a master patent, seeing that the general principles underlying his devices are perfectly well known to all electricians. In its present embryonic stage of development its sphere of usefulness would seem to be an exceedingly limited one, viz., communication with outlying lighthouses and light-vessels and with fleets. Of course the Marconi device may develop into something having a much greater range and a much greater reliability than is at present the case, but meanwhile sober investors would do well to hold off, though, no doubt, if they care to become speculators their investments may become exceedingly valuable."





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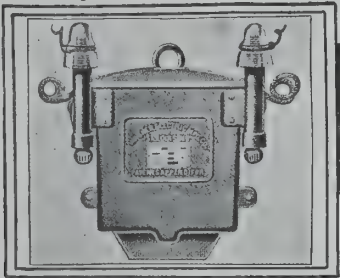
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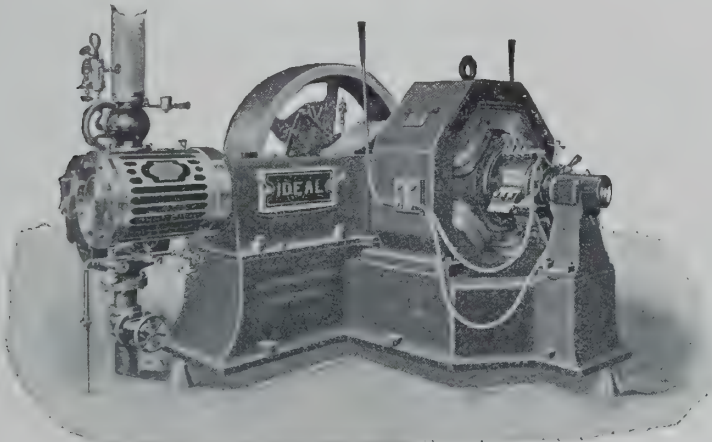
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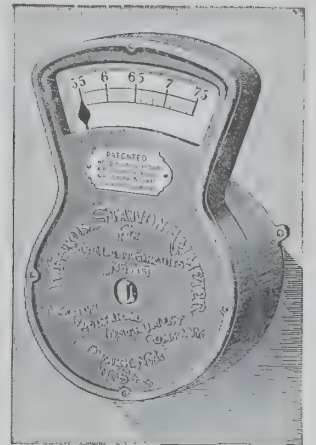
The Weston  
Arc Light

### AMMETER

IS CHEAP, BUT  
NEVERTHELESS RELIABLE  
AND VERY ACCURATE.

The scale is so proportioned that a change of 1/2 of one ampere can be seen from a considerable distance. The instrument is absolutely "dead beat." Three different ranges are being made:

No. 1.—5.8, 6.8, 7.8 amperes en 1/10 ampere div.  
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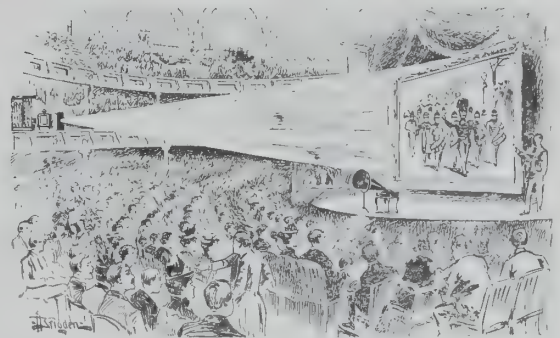
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Travelling Showman  
should possess an  
Edison Projecting  
Kinetoscope combined  
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Projecting Kinetoscope, \$100  
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Can be used with electric,  
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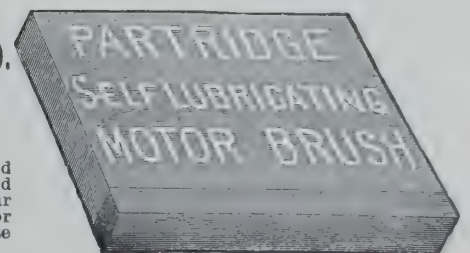
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Office and Factory,

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These Carbons are for Generators and Motors of all kinds. Specially adapted for Fan Motors and Electric Street Car Work. In ordering through supply or commission houses send us duplicate order.





### New Catalogues and Trade Publications.

*These catalogues may be had free of charge on application to the firms issuing them. Please mention THE AMERICAN EXPORTER when you write.*

—WHITING, MACOMBER & WHITING, South Framingham, Mass., U. S. A., issue a small circular entitled "Progress in Wrenches." It is neatly printed and adapted to go into an ordinary envelope. The information it contains is well arranged and to the point. The title is a happy one. Illustrated and contains price list.

—THE BLACK MANUFACTURING COMPANY, Erie, Pa., U. S. A. Regular 1898 catalogue, handsomely printed and finely illustrated. In addition to detailed description of the numerous "Tribune" and "Arena" models offered by this firm the catalogue contains careful and well-illustrated descriptions of each part with an account of the materials used in its construction. There is a particularly full account of the cycloidal sprocket, which is a valuable feature of this firm's wheels. The company makes no extravagant and impossible claims, but every assertion is evidently to be backed up in the quality of their work. Catalogue contains price list of extras and a telegraph code.

—THE ILLINOIS CUTLERY COMPANY, Decatur, Ill., U. S. A., have just sent us their new Export Special containing an illustrated price list of their specialties. In addition to their various lines of cutlery we notice quite a number of small metal specialties such as meat tenderers, can openers, spiral screw drivers, waffle irons, etc., also large and small corn shellers. One fourth of the space is devoted to detailed and illustrated description of the "Illinois" models of low-priced bicycles made by this firm and to which they call especial attention.

—THE CHALLENGE MACHINERY COMPANY, 2529 Leo street, Chicago, Ill., U. S. A., printers' machinery. This company has just issued three interesting booklets bearing somewhat unique titles as follows: "Pulling the Devil's Tail," "A Cut in Paper" and "Printing Money." The first deals with the company's Ideal hand press, the second describes an improved paper cutter for printers' use, the third is devoted to a portrayal of the company's Challenge Gordon job press with illustrations of many of its special improvements.

—OWEN & SALTER, Twelfth and Buttonwood streets, Philadelphia, Pa., U. S. A. (cable address, "Owsa," Philadelphia): A neat little booklet, well printed, strongly bound and adapted to be preserved for reference. All the specialties of this company, fine sanitary goods of every description, including toilet and bath room fittings, shower baths, lavatory fixtures, stop cocks, compression bibbs and automatic fittings, are fully described and clearly illustrated. A novel and valuable feature of the price list is that it gives the gross and net weight of every article and the exact size of package when ready for shipment. Is printed in English and Spanish.

—CHALLENGE WINDMILL AND FEEDMILL COMPANY, Batavia, Ill., U. S. A.: A catalogue of 132 octavo pages, giving descriptions and illustrations of their steel windmills and steel towers, pumping and geared sectional windmills, pumps, tanks, feedmills, corn and cob crushers, sweep grinders, shellers, feed cutters, wood saws, horse powers, etc. The lines described in this immense catalogue include lawn and sidewalk hydrants, garden hose, sprinklers, couplings, fittings and all tools and supplies required for handling and repairing the various lines of machines described. We note also that this company makes steam pumps, pumping engines, etc.

—THE CARDWELL MACHINE COMPANY, 1900 Cary street, Richmond, Va., U. S. A. (cable address "Cardwell," Richmond): Catalogue and circulars describing tobacco machinery of every description, including tobacco granulators, power automatic tobacco weigher and packer, cutters and casing machines; also oil mill machinery, hydraulic cotton baling presses and pumps and peanut machinery of all kinds.

—THE HAZELTON BOILER COMPANY, 716 East 13th street, New York, U. S. A. (cable address "Paila, N. Y."), has just issued a very striking book entitled "The Generation of Power." In addition to giving full information regarding the "Porcupine" boilers made by this company, with numerous illustrations of plants in which these boilers are now in use, this work contains tables and other valuable data selected from standard authors regarding every detail in the generation of steam power. It would be difficult to think of a practical problem in boiler management that this book would not assist in solving. Whether needing boilers or not manufacturers and engineers will do well to send for this valuable reference work. A complete index adds greatly to the convenience of the reader in consulting the tables.

—AMERICAN CLAY-WORKING MACHINERY COMPANY, Bucyrus, Ohio, U. S. A. (cable address, "Brick," Bucyrus, Ohio). One of the finest catalogues that

has come to our attention for a long time is this 196 page, 8vo. book, finely illustrated and printed in two colors. It contains illustrated descriptions of a complete line of clay-working machinery, brick-making machinery, sewer pipe machinery, roofing tile machinery, terra cotta machinery and every appliance known in the manufacture of structural ceramics. A considerable space is devoted to various types of trucks and wagons for clay and brick carrying, and, as for two years past, a goodly number of pages are given up to hollow block mechanism, with illustrations of dies for hollow building blocks manufactured by this company. A complete index, together with a special index of new machines added to their list during the past year, add greatly to the value of the catalogue.

—HUNT MANUFACTURING COMPANY, Westboro, Mass., U. S. A. The 1898 catalogue of this firm is a pretty little booklet adapted to go into an ordinary letter envelope. Handsomely printed and illustrated and contains descriptions and prices of the numerous bicycle saddles and saddle posts and clamps which form the specialty of this firm. It would be difficult to imagine a practical type of bicycle saddle that is not represented in this catalogue.

### German-American Trade Relations.

THE *Kölnische Zeitung*, Cologne, in a long article urges the German Government to conclude a commercial treaty with the United States. The *Zeitung* admits, without further ado, that Germany must not, if she can possibly help it, begin a tariff war with the United States, as the advantage would be very much on our side. On the other hand, its figures show that the trade between the two countries is pretty evenly balanced. As regards breadstuffs, Germany is rather independent of American supplies, but raw material for her industries is very much in demand. We quote as follows:

"There can be no reasonable protest against the Dingley tariff, for every country has a right to fix its duties according to its own interests, unless it is tied by treaties. German industries must try to extend their activity in spite of the tariff, just as during the period of the McKinley tariff, which, after all, was not so very destructive in its results. Germany, nevertheless, must see that she is not treated worse than other countries so long as she herself grants to the Union all rights of the most favored nation clause. That is the case with our export of sugar. No other country can justly claim the right to put a special duty on goods whose export we seek to facilitate. What would become of international commerce if every country were given the right to examine into the industrial condition of another people! A lowering of the tax rate, guaranty of interest on capital invested, cheap fruit, etc., would have to be included, as well as direct bounties. The American Government and the House of Representatives have acknowledged the justice of our claims, but the Senate, influenced by the sugar magnates, has consented to additional violation of our rights. This proves that it is high time to conclude a satisfactory commercial treaty with the United States. Our agrarian hot heads shout for 'repressive measures' against the United States, and do not even fear a tariff war. But such a step should be contemplated ten times ere it is taken."

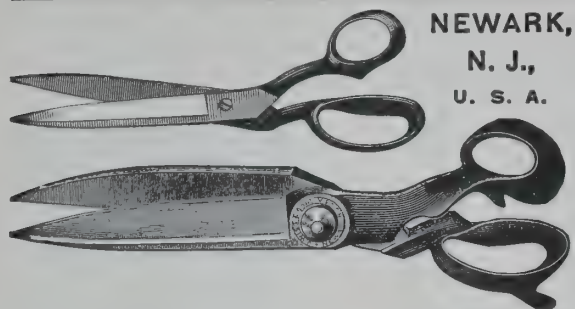
The paper then quotes some interesting statistics, from which we take the following:

"Germany exports to the United States goods valued at nearly \$94,250,000. Of this over \$12,500,000 is for sugar, the rest chiefly for manufactures, such as cottons, woollens, silks, leather, steel, paints, paper, etc. The United States sends to Germany \$96,600,000 worth, of which nearly \$42,000,000 is for cotton and \$7,500,000 for oil. Copper, skins, seed cakes, tobacco and wood are also important articles. All these Germany does not produce at all, or in insufficient quantities, and it is not easy to exclude them. American wheat and flour exports to Germany are comparatively insignificant—\$608,000 for the former and \$632,000 for the latter. There are, however, \$8,000,000 for lard, \$5,000,000 for Indian corn, and \$1,700,000 for oleomargarine. These articles could be taxed to enforce better treatment of German sugar."

The paper then proceeds to comment as follows:

"If the above is examined without prejudice, it will be seen that Germany could not wish for a better commercial friend than the United States, since America takes our manufactures and sends us the raw material we need. Who would suffer most by a tariff war? The answer is easy to find. Yet Germany cannot afford to see one of her principal articles of export treated worse than that of other countries, and a new regulation of our commercial treaties is therefore very necessary. Thus far the old treaty with Prussia—concluded in 1828—has been made to do duty for all Germany, but its legality in this respect has often been doubted. As the Dingley law enables the President to conclude treaties, it is worth our while to take advantage of this clause."





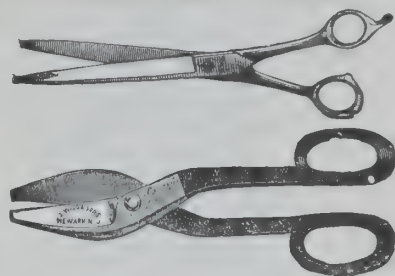
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Harness Saddle Trees (in iron), Gig, Track,  
Coupe, Express. All styles and sizes.Harness Saddle Mountings, such as Terrets,  
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Brass, Nickel and Imitation Rubber Finish.

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## Standard Steam Appliances.

Awarded the GOLD MEDAL at Paris, 1889.

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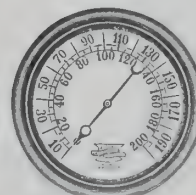
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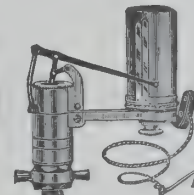
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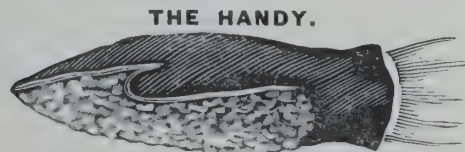
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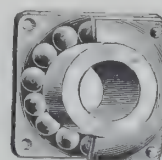
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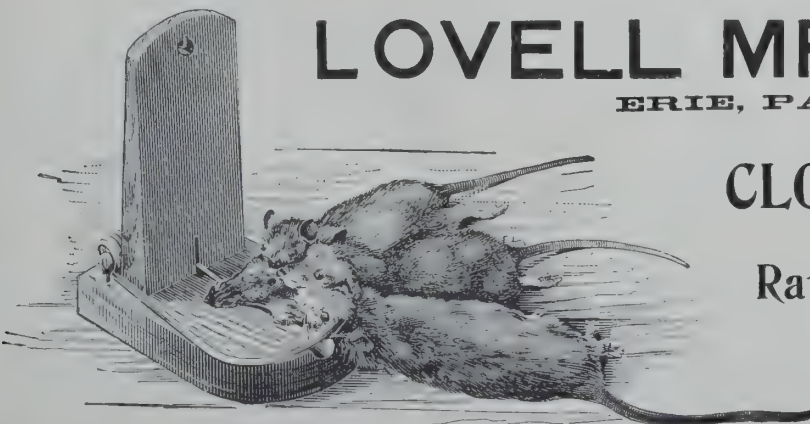
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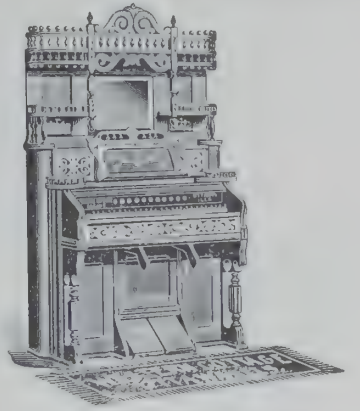


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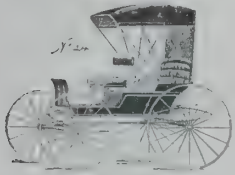


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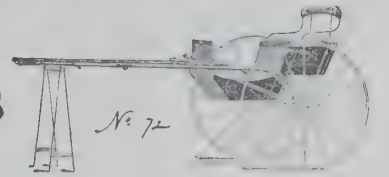
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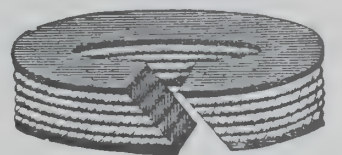
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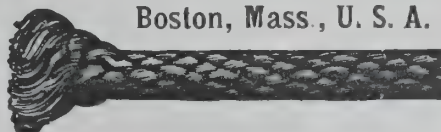
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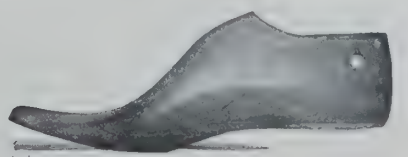
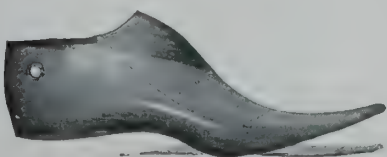
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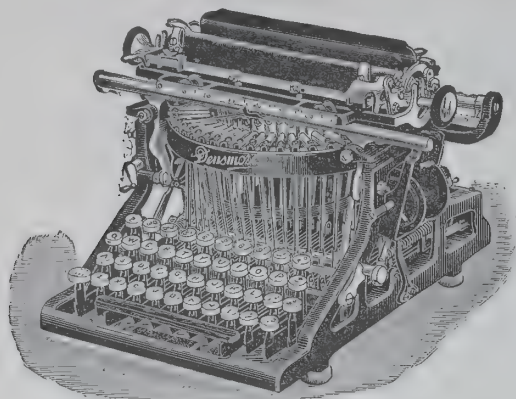
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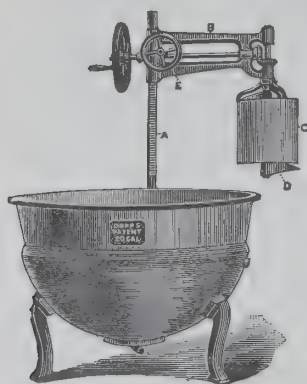
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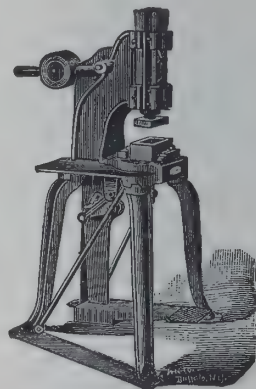
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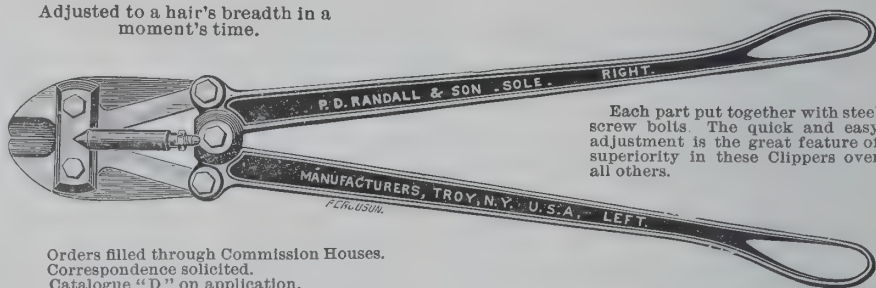


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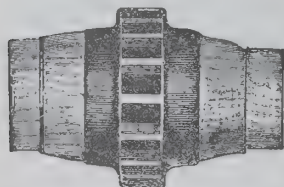
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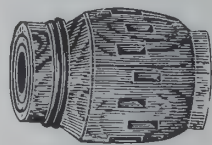
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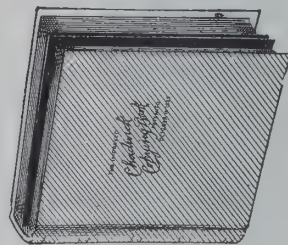


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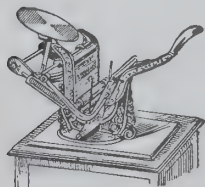


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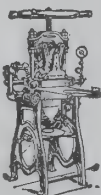


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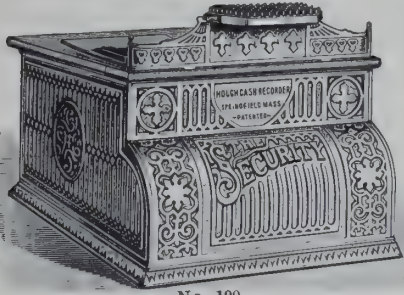
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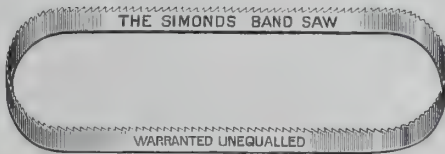
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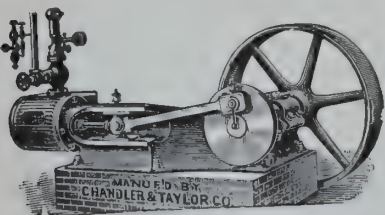
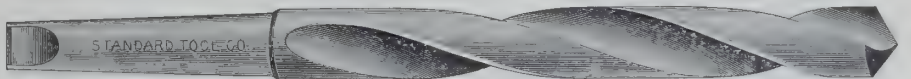
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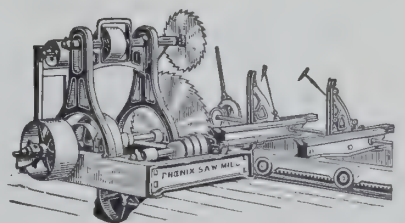
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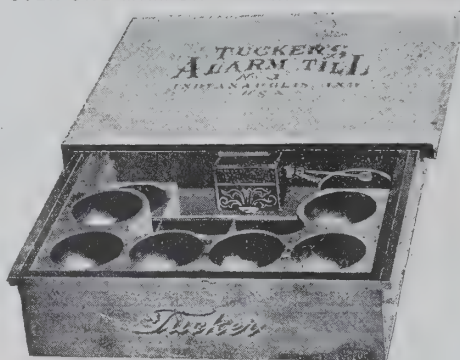
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Opens like a  
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A terror  
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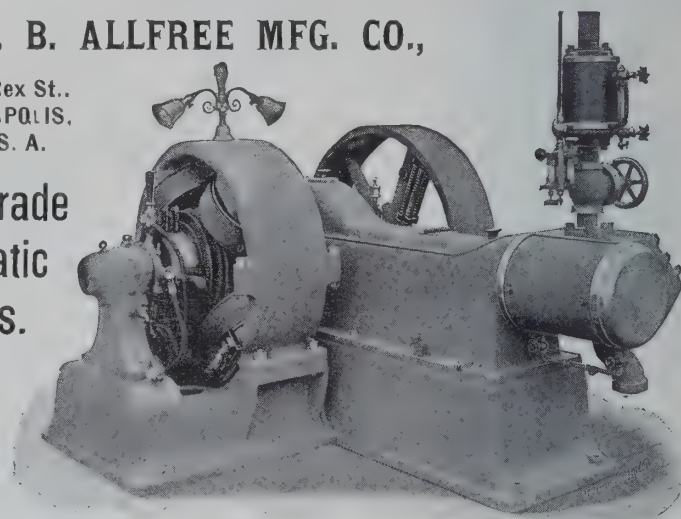
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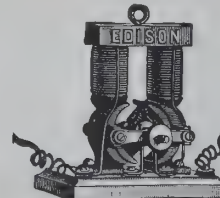


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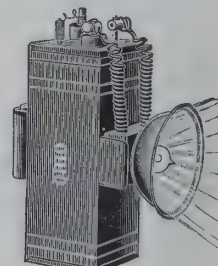
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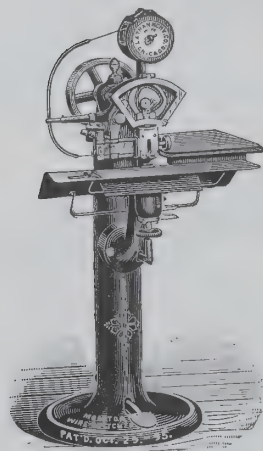
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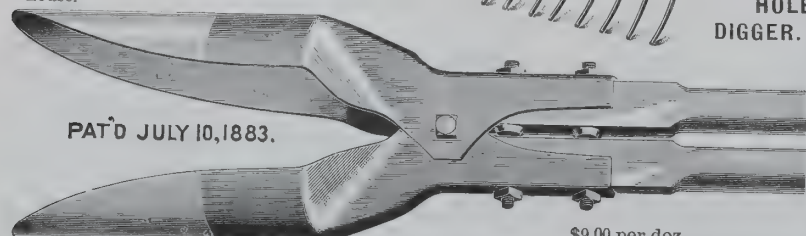
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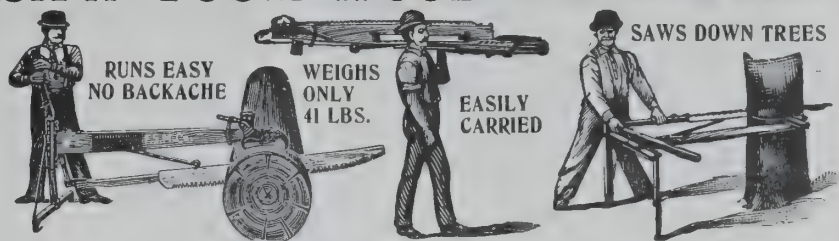
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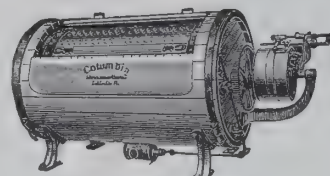
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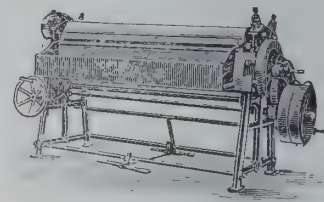
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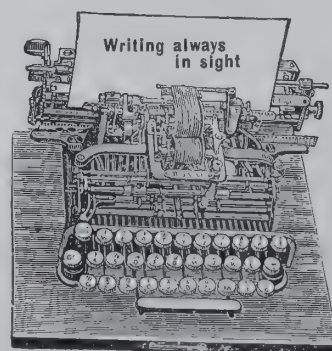
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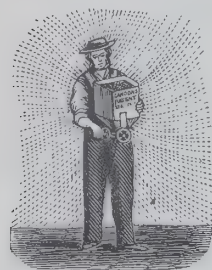
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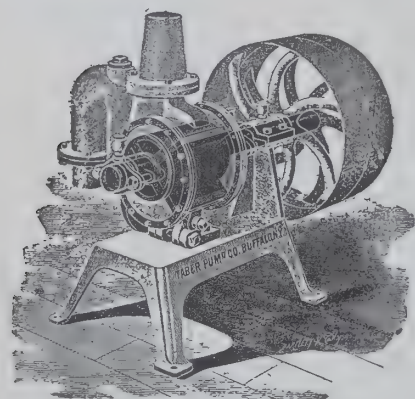
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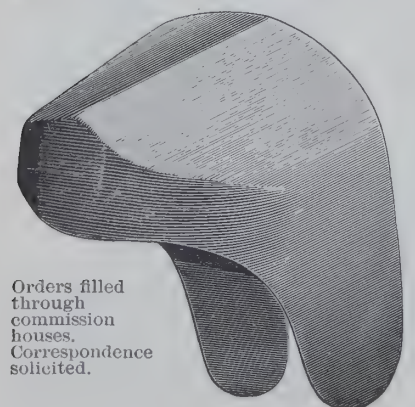
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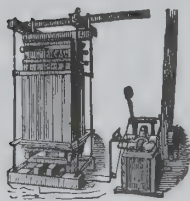






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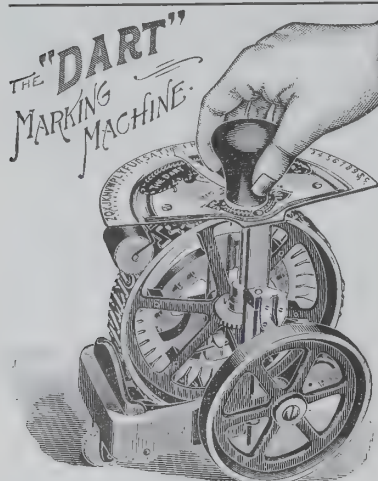
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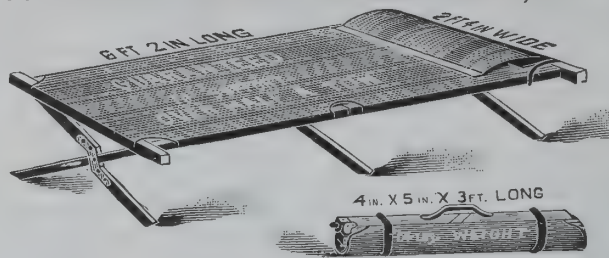
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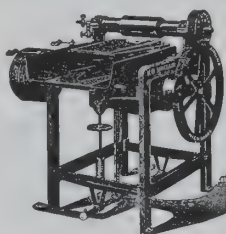
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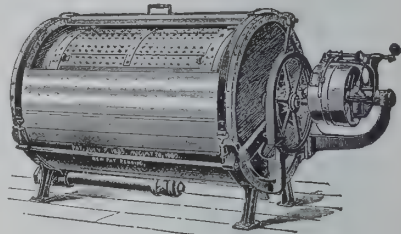
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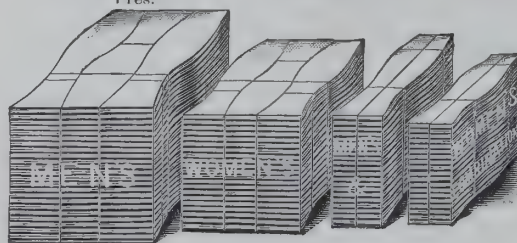
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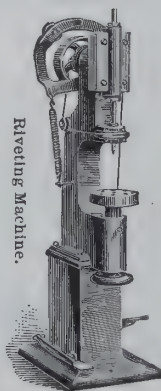
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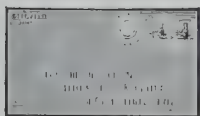


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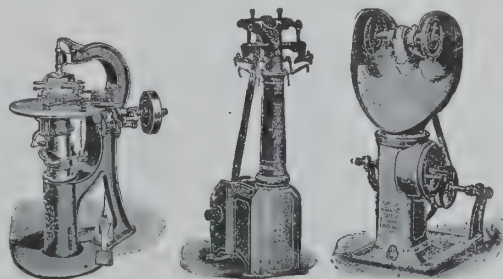
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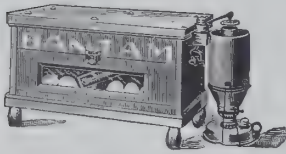
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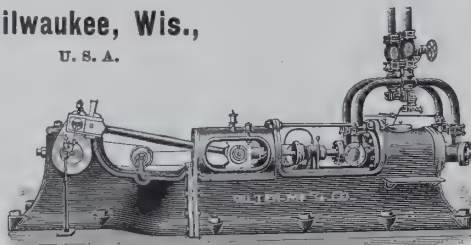
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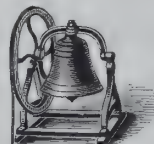
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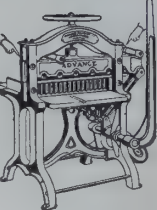
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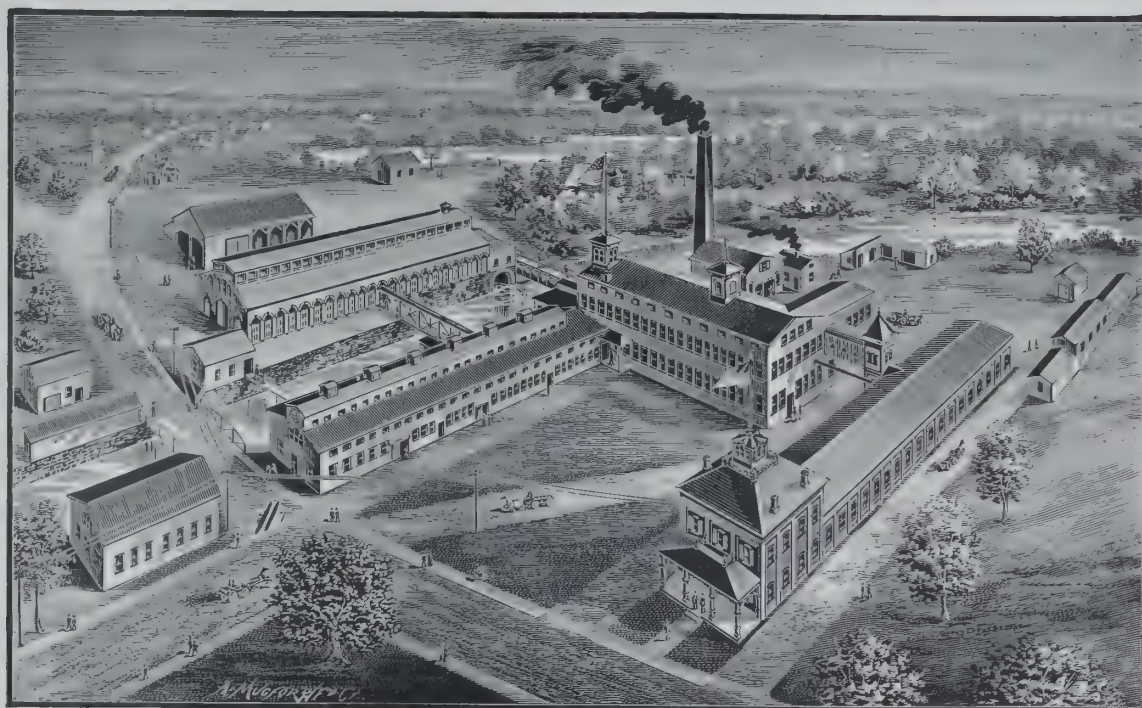
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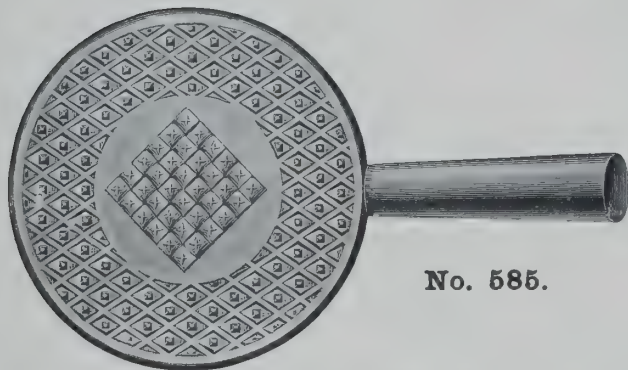


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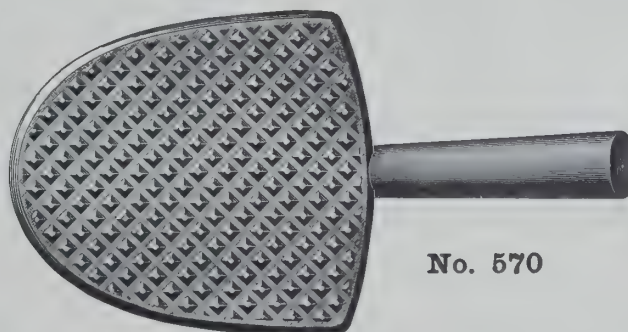


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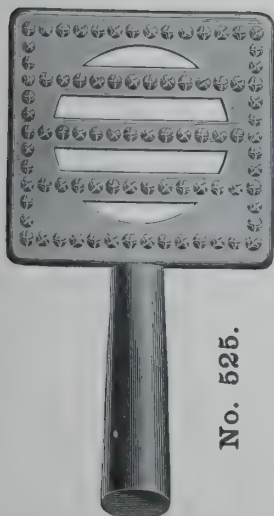
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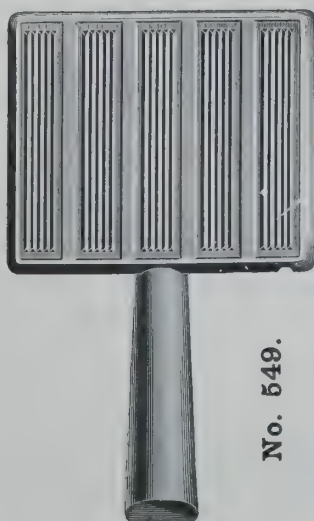
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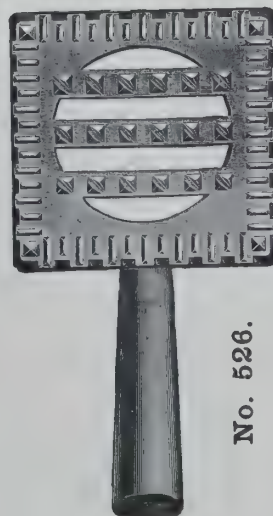
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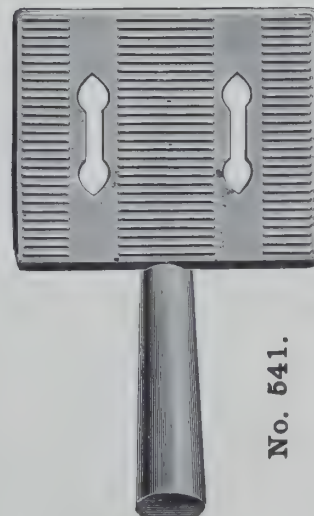
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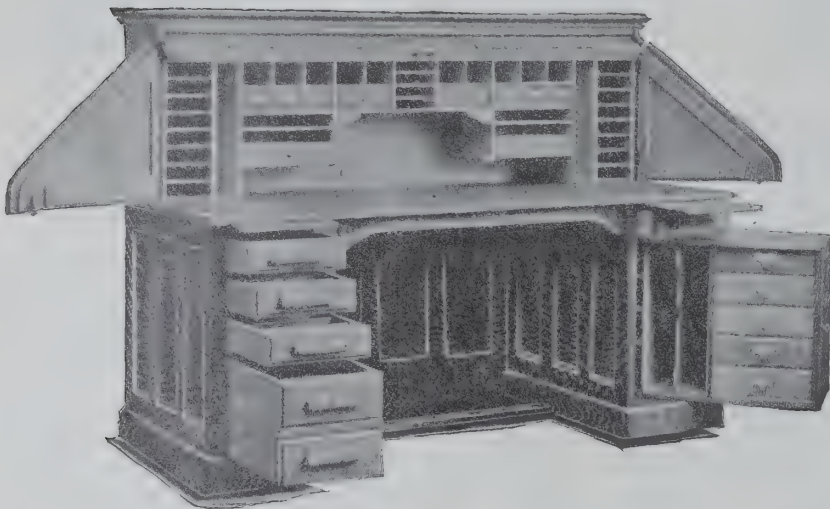


# DESKS!

# DESKS!!

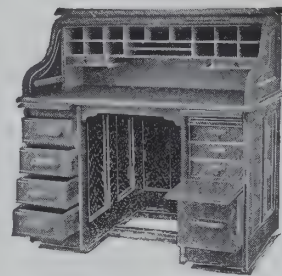
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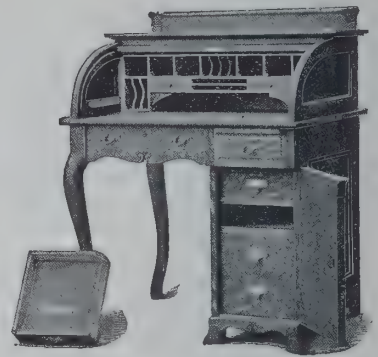
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**\$45.00** buys this desk exactly as illustrated. It is 66 inches long, 33 inches wide, 51 inches high. It is made of the finest selected quarter sawed white oak, and has swinging side arms and FIVE COMPLETE LETTER FILES. 66 inches long, style "A," \$45.00. Style "B" or "C," \$41.00. 72 inches long, style "A," \$49.00. Style "B" or "C," \$45.00.



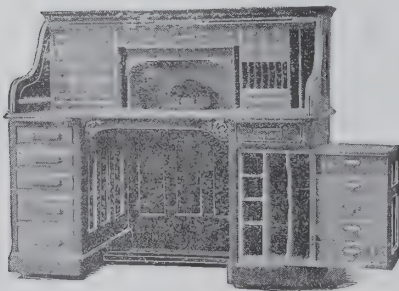
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**\$17.00** buys this desk exactly as illustrated. It is made of quarter-sawed white oak and is supplied with LETTER FILES and large drawer in right pedestal. Size, 36 inches long, 28 inches wide, 44 inches high.

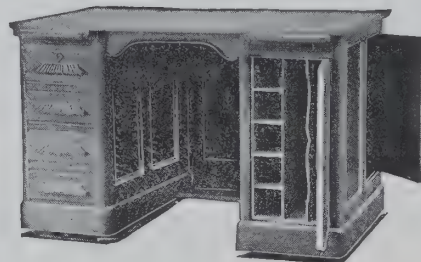


NO. P. 212, STYLE "A."

**\$43.50** buys this desk exactly as illustrated. It is 60 inches long, 33 inches wide, 52 inches high. It is an extra fine desk, made of quarter-sawed white oak and has FIVE COMPLETE LETTER FILES in the right swing pedestal.

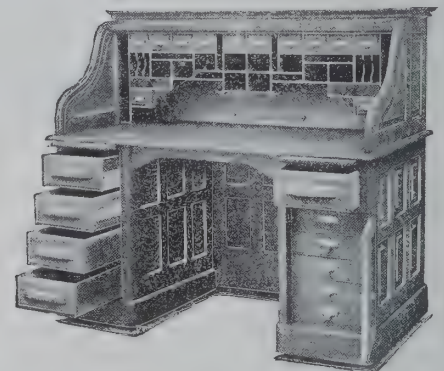
60 inches long, style "A," \$43.50.  
Style "B" or "C," \$40.00

**NOTE.**—Style "A" has drawers in left pedestal and letter files in right pedestal as illustrated. Every person must have some place for letters, invoices, receipts, etc. Style "A" provides complete LETTER FILES within arm's reach, dust proof and under lock and key—a very desirable feature. Style "B" has drawers in both right and left pedestals. Style "C" has drawers in left pedestal and book cupboard in right pedestal.



NO. P. 216, "C."

**\$11.60** buys this desk exactly as illustrated. It is 50 inches long, 30 inches wide, 31 inches high. It has closed back and is made of selected oak. Style "B" or "C," \$11.60.



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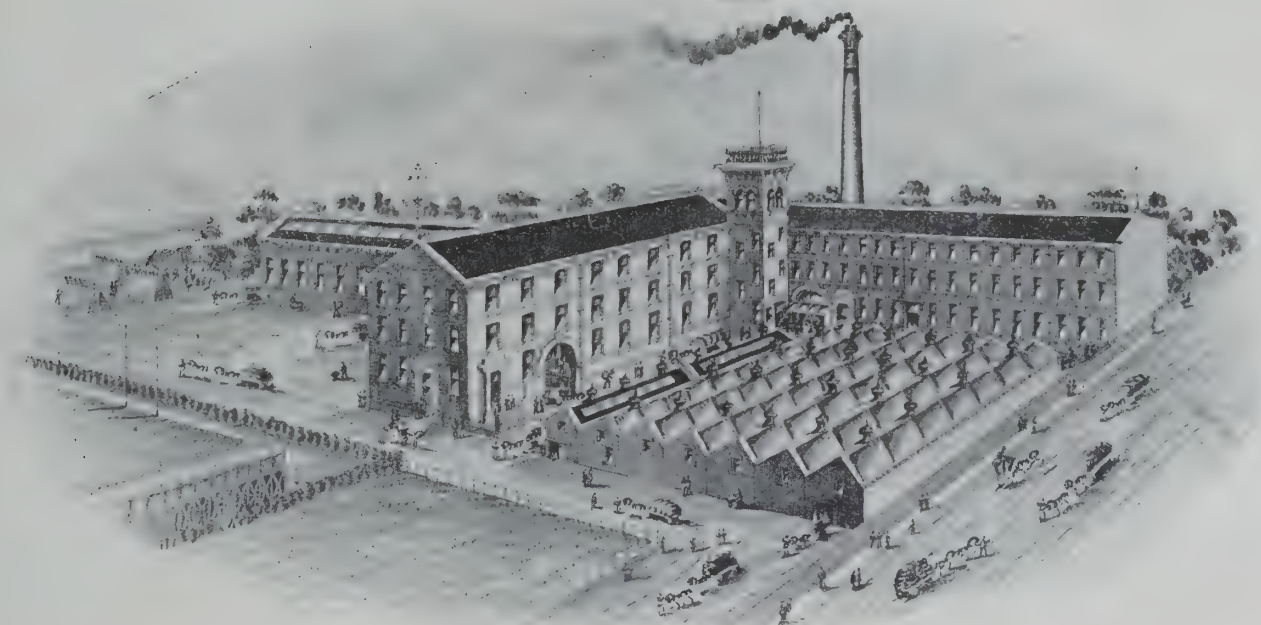


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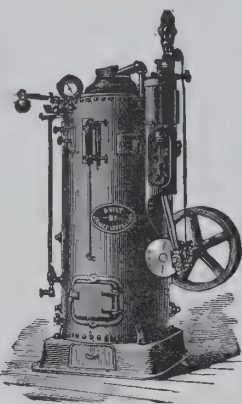
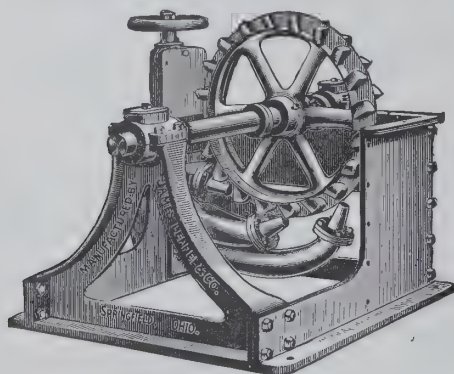
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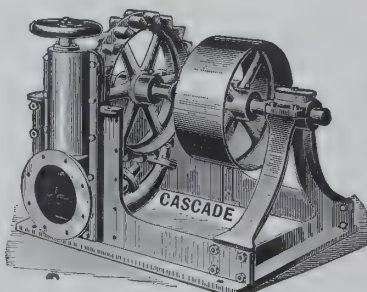
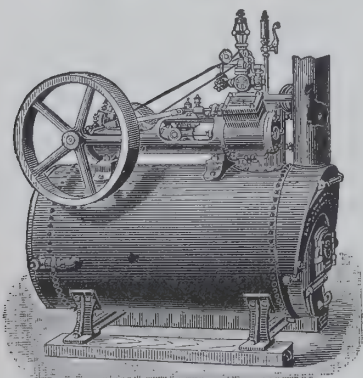
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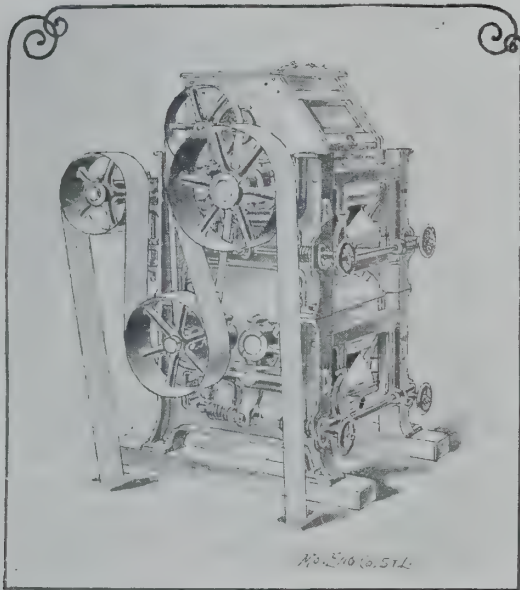
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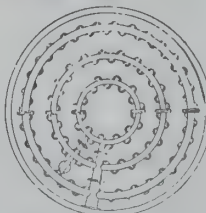
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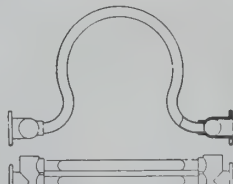
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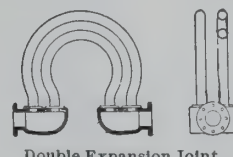
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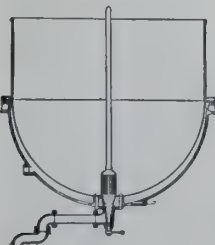
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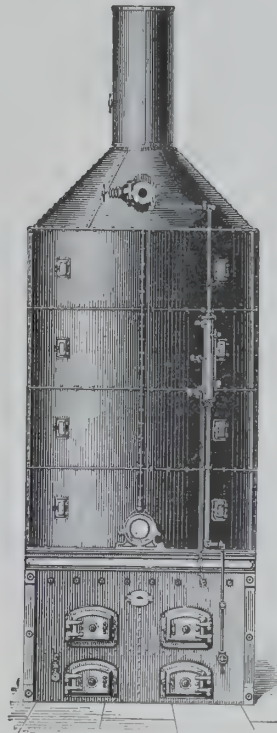


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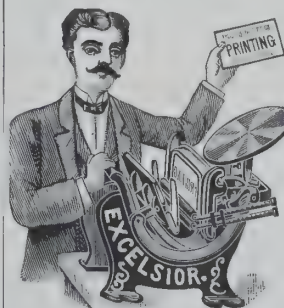
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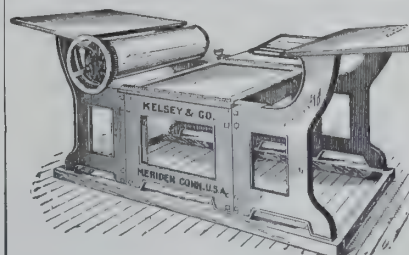


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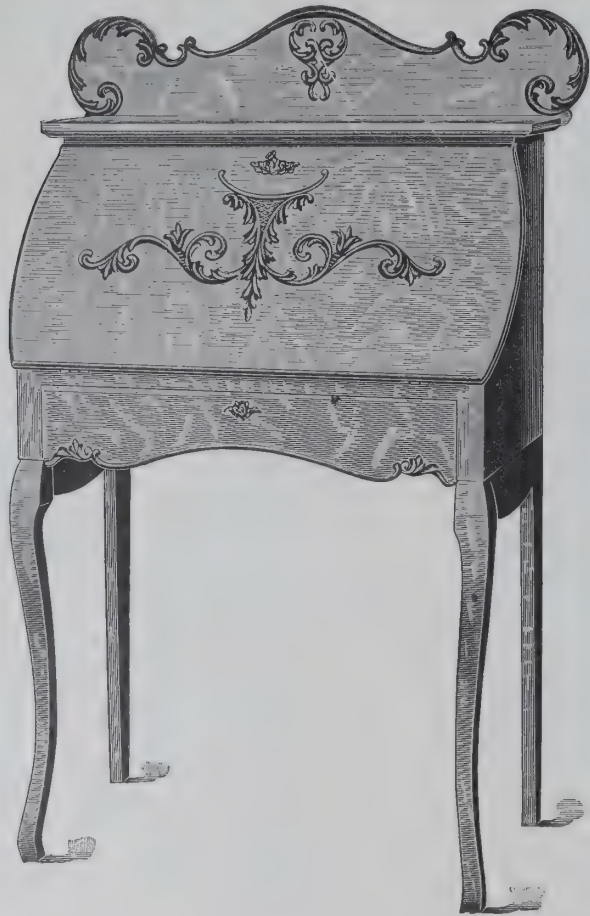
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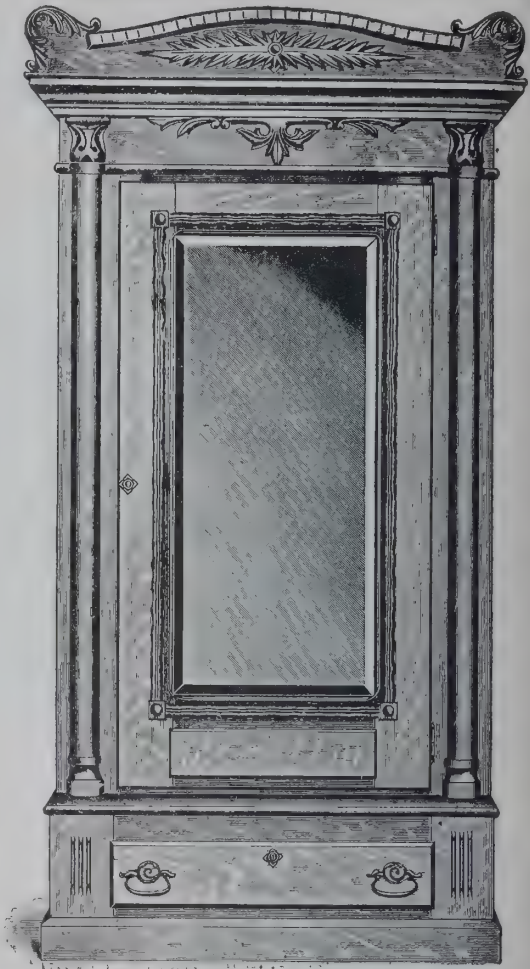




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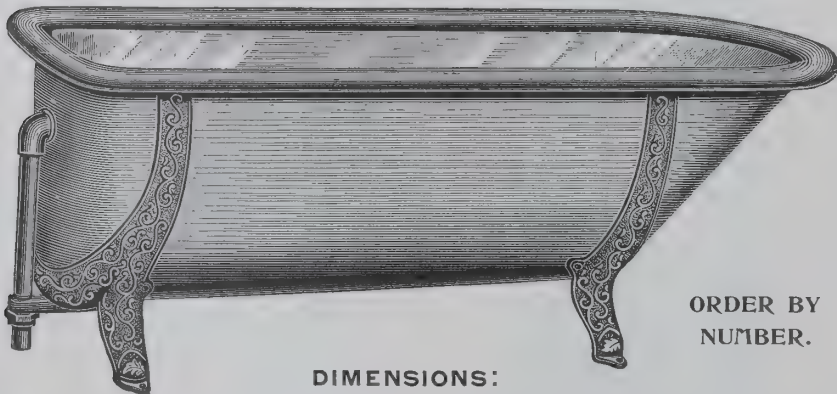
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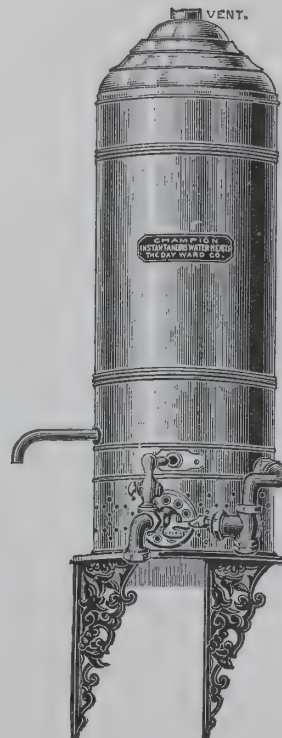
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# THE AMERICAN EXPORTER

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## THE CHEAPEST MACHINERY—COST OF PRODUCTION.

AS industrial undertakings become more complex and vast, calling for machinery of numerous and often exceedingly costly types for their success, the problem of determining the market where the cheapest machinery—using the term in the sense defined in our last number—can be procured becomes an important and difficult one. The manager or purchasing agent of a mill, mine or commission house must study how a given market will satisfy a dozen exacting conditions before venturing to commit his firm to contracts involving large sums and designed to procure equipments that shall be effective and “up to date” for a long term of years. Initial cost is only one, and by no means the most important, of these preliminary considerations. The labor-saving capacity of the proposed machine, its running cost, its probable “life” as measured in working hours, its liability to repairs, necessitating perhaps a costly shutdown at the most inopportune time, its rapidity and evenness of action, with the resulting uniformity of product and its adaptability to local conditions, these are but a few of the lines of inquiry along which an intelligent modern buyer must seek to inform himself before signing a machinery contract.

For the present, however, we shall consider but one of these lines of investigation—initial cost. Now initial cost, or price, must always be determined largely by cost of production. No manufacturer is likely for any length of time to charge less for his products than it costs him to produce them, nor will the competition of his rivals permit him to charge greatly more. So it is with cost of production that we are really concerned when investigating the capacity of a given market to produce machinery at a low initial cost.

The extraordinary development of the natural resources of the United States is the cause of considerable misapprehension on the

part of foreign buyers. Aware that the cost of raw materials of many kinds, notably of most of the metals, was, not long ago, high in this country they assume that this is still the case and experience no little difficulty in keeping up, so to speak, with the almost bewildering fall of prices that has been going on over here. To take but a few examples. Not a dozen years ago aluminum ranked almost with gold in expensiveness. To-day the price, measured by the foot in sheets, is lower than that of brass, owing to the utilization of cheap Niagara power. The copper market of the world is now controlled by the conditions of American supply and demand, the immense output of the Lake Superior mines dominating the former and the enormous demand of American electrical concerns fairly controlling the latter. Seven years ago not a factory was engaged in the production of tin-plate in this country. Now the output of the works on this side of the Atlantic supplies the domestic demand and is beginning to be offered abroad, and at lower prices than have ever prevailed before.

The fall in the price of steel is still more important and is equally amazing. Bessemer steel was not made in the United States until 1867, when American steel rails sold for \$160 a ton. Four years later the price had fallen to \$102. In 1873 many mills started up owing to the immense demand occasioned by American railroad development. That year rails sold for \$90. Ten years later the price was \$62. To-day American steel rails, vastly superior in style and finish, are selling at from \$19 to \$17 per ton, and at those prices are competing in every market in the world. Similar accounts might be given of progress in nearly every other line of production that affects the price of the raw materials used by the American manufacturer of machinery. Far from having a disadvantage as compared to his rivals in other lands he enjoys in this respect unlimited resources. Not only are the prices of his raw materials as low as the lowest but he can depend upon procuring them in any desired quantity and with surpassing promptness.

Another point that in the minds of many foreign buyers leads to the assumption that the cost of production is high in America is the high price of labor here. But while the *price* of labor is undeniably high—and we rejoice that this is the case—its *cost* to the manufacturer, when the relative output of the respective laborers is considered, is as low as that of any labor in existence. The American machine shop is filled with men of high skill, industry, alertness, energy, enterprise and inventiveness. Trade unions have as yet failed to gain any ground in the ranks of such skilled laborers as machinists (engineers) in this country and there are no indications that they are likely to be more successful in the future. High wages bring self-respect and increased opportunities for self-culture. The hours of labor are moderate, occasionally eight, usually nine or ten. The theory that overseers should come from the better class is unknown, for there are no class distinctions here. The knowledge that his foreman, superintendent, and very likely his employer, were once workmen like himself, who have risen from the ranks through superior industry or inventiveness, encourages each laborer to emulate their example. There is every incentive to invention with the result that the natural inventiveness of the race has been stimulated into still greater activity until it has come to be regarded generally as a national characteristic. The vast importance of having such labor in a machine shop can readily be appreciated.

Closely allied to this high efficiency of labor as a factor in the reduction of cost in the manufacture of machinery in America is the labor-saving machinery so universally employed in American shops. An inventive machinist who devises a contrivance for saving his own labor in the performance of a task crystallizes, so to speak, his ingenuity, so that the resulting machine represents his ingenious brain and cunning fingers in every factory to which it goes. We need not go into detailed illustrations of the vast savings daily effected by the use of labor-saving appliances in American shops. Suffice it to say that the reduction in cost made possible by low-cost raw materials and highly skilled labor taken together does not equal that brought about by the use of labor-saving machinery.

The latest development in the direction of cost reduction in



America is as yet in its infancy. It has been found that savings along every possible line can be effected by consolidating large interests engaged in similar lines of production under one management. This is, perhaps, the most notable industrial movement of the century and its effects can as yet be foreseen but dimly. One effect, however, is already obvious. The cost of production, particularly of such products as are in immense demand, such as pig iron, steel rails, etc., has been reduced enormously, and the capacity to fill orders of any amount correspondingly increased.

The fact that America has but recently begun to compete in the world's markets has caused some buyers to suppose that American manufacturers lack experience, reasoning probably that because they have never heard of them before they must have just commenced operations. They forget that the American manufacturer has for years been trying to catch up with the vast and rapidly expanding home market, and that it is only because he has at last caught up that he offers his wares abroad at all. So far from lacking experience many firms have been engaged for years in making and perfecting machines designed to perform certain kinds of work before it was known abroad that such work could be done by machinery at all.

The wide diversity of industries here and the demand for labor-saving machinery in all of them has given rise to a diversity of experience on the part of American machine manufacturers that is altogether without parallel. In no matter what class of machinery the buyer may be interested he will do well to investigate the ability of the American market to supply his needs before making a contract. He may rest assured that so far as the single quality of lowness of price is concerned there are few lines in which an investigation of that market will not result in a substantial saving to his firm if his motto is "cheapness—quality considered." With regard to some of the other important requisites for machinery that is really the cheapest we may have something to say in future issues of THE AMERICAN EXPORTER.

### "AMERICAN."

THE United States has sometimes been referred to by its English critics as "the only nation in the world without a national adjective." This fact has usually been stated as a sort of reproach. Assuming it to be true we cannot for the life of us see any particular disgrace attaching to the fact that good use—which is the law that governs all word-making—does not sanction an adjective ending after United States. But is it true? We will not insist overmuch upon such phrases as "the United States flag," because we have always had a suspicion of their etymology and have regarded them as clumsy at the best. Nor shall we rack our brains to find other lands that have not been blessed with a national adjective. Whether our English contemporaries habitually speak of "New South Welsh" and "Cape Colonial" we shall not stop to inquire.

But with regard to the United States this country *has* a national adjective that is coming to be more and more its exclusive property as years go by. It certainly was not the purpose of the founders of the Republic to arrogate to themselves the name of the entire continent wrongly named after a contemporary of Columbus when they styled the infant nation "The United States of America." Nor has it been due to any effort on the part of their successors that the term "American" has gradually come to suggest to foreign minds, as a noun the people, as an adjective the products of the United States.

We shall not attempt to discover nor presume to discuss the causes that have led the people of other lands to connect the term "American" with the United States, and employ the more local adjectives "Canadian," "Mexican," "Brazilian," etc., when referring to other portions of the continent. It may be that when Rhodesia shall have expanded into an empire extending from the Mediterranean to the Cape of Good Hope its products and people will be called "African" by their contemporaries. Such a suppo-

sition may suggest a partial explanation of the subtle mind process that in a hundred lands invariably associates "American" with the United States.

But we need not trouble ourselves as to causes, and we can safely leave etymological processes to the dictionary-makers. It is enough that the United States is spared the dishonor—if there is any—of being the only land without a national adjective.

### REFORMS IN THE CONSULAR SERVICE.

IT is a matter for profound satisfaction, not only among citizens of the United States, but among all who have commercial dealings with this country, that the movement in favor of a thorough reform of our Consular Service is steadily gaining ground. Most of our readers are doubtless tolerably familiar with the term "spoils system." The phrase first came to be used in American politics during the term of President JACKSON, one of whose followers quoted the ancient maxim, "To the victors belong the spoils," in justification of that wholesale removal of Federal office-holders to make room for friends of the Administration that gave "the reign of ANDREW JACKSON" a bad fame among historians. The system itself probably began as early as the administration of JEFFERSON, but it quickly became the policy of every incoming administration. There is no branch of our Government where the introduction of this vicious system has proved more disastrous than in the Consular Service. A steadily increasing movement in favor of civil service reform has gradually placed a large number of Federal offices beyond the reach of the politicians but thus far the Consular Service has remained their lawful prey.

The evils of this state of affairs are too glaring to require more than the briefest mention. These offices are given, not to those who can administer them the most efficiently, but as a reward for party service. A removal is inevitable when the appointing administration goes out of power, hence there is no incentive to exceptional activity. Only the grossest inefficiency is likely to cause a dismissal before that time, so there is no check upon laziness. As a rule the appointees are able and worthy men, however, so the system does not work so badly in this respect as perhaps might be expected. But the best men must inevitably require some time to "learn the ropes" of their new positions. It is not too much to say that half of the allotted time of every consul is gone before he has reached the full measure of his usefulness. He must learn the customs of the country, and too often its language, must form acquaintances, master local conditions, in short develop himself along a score of different lines before he can justly feel that he is representing his country to the limit of his ability. When these preliminary lessons are all learned and he is in a fair way to become a thoroughly valuable man, off goes his official head!

It is an extraordinary feature of this system of appointment that for over two months every four years the entire Consular Service, as well as the Diplomatic, with which we are not at present concerned, is on double pay. When a consul is appointed he is entitled to thirty days' pay while receiving supposed instructions before leaving for his post of duty. Then he is allowed full pay for the time in transit to his post, which, taking the world over, will probably average twenty days. Then he is allowed additional full pay as consul after arriving at his post but waiting to take charge. This will make ten days more. During these sixty days his predecessor has of course been steadily drawing a salary. This he will do until he is safely home again—another twenty days of double pay to cover any possible exaggeration in our other figures. All this in order that men who have had four years' experience and training, and who have perhaps won the confidence of the communities in which they served, who know how to represent their country and know the needs of commerce, may be replaced by men who, however estimable, must begin at the beginning and consume half their terms in relearning the lesson.

President SEARCH, of the National Association of Manufacturers, in his address at the convention last January, pointed out the



sweeping changes that have been made since the present Administration came into power.

In the principal home countries, exclusive of colonies, there are about 150 consuls, not counting vice-consuls, consular agents and other minor offices. Of these 150 consuls 98 have been changed since last March. There are 36 consulates-general, and in these there have been 34 changes within the past ten months; several officials having been changed twice during that period. In China there are 9 consuls, 7 of whom have been changed; in Austria all of the 4 consuls are new within the past year; in France 10 out of 12 have been changed; in Germany 21 out of 25; in the United Kingdom 12 out of 17; in Italy 6 out of 10; in Mexico 9 out of 13; in Brazil 3 out of 4, and in Colombia 3 out of 4 have undergone change since the beginning of the present Administration. In all there have been 276 appointments in the Consular Service of the United States since last March, and the majority of the offices in which there has been no change are of minor importance.

The evil of a system which will permit such disorganization every four years is apparent. It does not require any argument to prove that the commercial interests of the United States in foreign countries must suffer heavily from the appointment of new and wholly untrained men in such large numbers. No business institution could survive such demoralization as this, and it is not reasonable to expect that so essentially commercial an institution as the Consular Service can be disorganized at will without impairment of its efficiency.

The fundamental reform which is demanded by all business men who have anything whatever to do with our Consular Service is that the entire organization be placed as soon as practicable under civil service rules. There may be important reasons why an administration might prefer to have its diplomatic representatives members of its own political organization, but the consuls are not, for the most part, in the Diplomatic Service, although they occasionally have to resort to diplomacy. Their chief duty is to promote the trade and commerce of the country. They are the representatives of all the business men who have foreign trade relations, regardless of party lines.

With all consuls under civil service rules several reforms would be insured.

1. Appointments would be made solely upon the basis of proper qualifications for each position, and without regard to party service.
2. Removals could only be made because of demonstrated incapacity.
3. Vacancies would be filled as far as possible by promotion or transfer.

These reforms are so fundamental and their good effect is so obvious that an extended discussion of them is unnecessary. High among the civil service requirements to be made of each candidate we would place personal character and sobriety, practical and thorough knowledge of business conditions, ability to use fluently the language of the people to whom the candidate wishes to be sent, and successful commercial experience. Two minor but important reforms could well be incorporated into the act extending the civil service to consular offices.

1. The compensation should be made sufficient to induce competent men to enter and remain in the service, and all consular fees should revert to the Government.
2. Only American citizens should be eligible to consulships.

At present the salaries paid to many of our consuls abroad not only fail to give them a living, but make them, and incidentally their country, a mark for comment by the colleagues with whom they are not able to keep up socially. On the other hand, a few consuls enjoy such immense revenues from consular fees that these favored appointments are regarded as among the choicest "plums" in the gift of the administration. If the salaries of all the consuls were doubled and all the so-called unofficial fees turned into the Treasury the Consular Service would yield a considerable surplus and be a source of revenue to the nation.

That representatives of the United States abroad should be citizens of this country would seem to go without saying, but as a matter of fact such is by no means universally the case. The writer recalls a city of over 200,000 inhabitants in the heart of one of the most commercial regions in Europe, where the consul not only was not an American but could not speak the language of this country. His value appeared to be in about inverse ratio to his diligence (in extorting fees from tourists).

It is doubtful whether the movement in favor of consular

reform will be crowned with success during this session of Congress but we hope to see some favorable action before the present Administration goes out of power. While not specifically indorsing the idea of civil service reform for the Consular Service the latest utterance of President McKinley on the subject gives us some reason to hope for progress in the right direction before long. We quote from the President's speech before the Cincinnati Commercial Club, October 30, 1897:

*"The Consular Service of the Government should be closely scrutinized and carefully officered, and we should have at every commercial port of the world a sensible and practical American, who, while discharging all his other duties with honor to the Government, will not omit in every proper way to promote American exchanges and encourage reciprocal trade."*

If it were in the power of the President alone, guided by such wise principles as these, to appoint all the members of the Consular Service, we should feel that any change, however well in theory, would be of doubtful expediency. But not only has the President, as Mr. SEARCH has pointed out, felt constrained to make practically a clean sweep of the consulships, but the power of appointment has been left absolutely and unreservedly with the Republican members of Congress, each receiving his share. Among so many no unity of purpose and no fixed standard of acquirements was to be expected.

We do not wish to convey the impression that the present consular service is grossly inefficient. On the contrary we regard it as composed of, for the most part, a very able and conscientious body of men. THE AMERICAN EXPORTER is proud to count among its warmest friends scores of our consuls abroad. But that there are a great many able and efficient men in the service is not because of the system of appointment and removal now in vogue but in spite of it. The sooner what is essentially a business branch of our Government is placed upon a business basis and conducted upon sound business principles the better it will be for all.

#### ELECTRIC LOCOMOTIVES AT STEAM TERMINALS.

AN interesting experiment is about to be made in the new Southern Union Depot now nearing completion at Boston. It is stated that no steam locomotives are to come within a mile of it, all of them dropping their trains or picking them up outside the electric limits. The advantages of this system—which has been in successful operation on the Belt Line tunnel at Baltimore in a modified form for some time—are obvious and important. The terminal depots of most large railroad systems are, as a rule, very fine, ornate, and expensive buildings. One has only to recall the vast Victoria Station, and the other huge London terminals, and the smaller but much more lavishly decorated stations of Paris and Berlin. On many of the state railways immense sums have been expended on depots the Grand Central Station at Dresden costing, it is said, no less than \$14,000,000, that of Frankfort \$8,500,000, Cologne \$6,000,000, Munich \$4,000,000, and so on. The presence of smoking locomotives in such splendid structures must inevitably tend to the more rapid decay of the decorations, however securely the train shed is separated from the rest of the building.

But of still greater importance is the discomfort both for patrons of the road and for those who are compelled to reside in the vicinity of such stations owing to the presence of steam locomotives. Within the depot the fumes of sulphur and other by-products of the combustion of locomotive fuel are often almost unendurable. Without, the screeching of engines, particularly of the little shifting engines, is a still greater nuisance. In many large terminal stations in England, notably in such places as Cardiff and Newport, where there is an exceptional movement of freight owing to the coal shipments, this screeching seems to those who are not accustomed to it to be almost incessant.

Both in America and Europe the superiority of electric engines as compared to steam for this service would be very great. With all the merits of the latter for long-distance hauling, there is no excuse for inflicting the discomforts occasioned by their presence



upon travellers and dwellers within urban limits when once the success of such an experiment as that to be made in Boston is fully demonstrated. With increasing civilization we are increasingly hostile to unnecessary noises, smells and other discomforts. A system that effectually does away with some so common, and heretofore so unavoidable, as these that we have been speaking of—and at little if any increased running cost—deserves to be heartily welcomed everywhere.

### AN EFFICIENT SERVICE.

IT is a pleasure to commend the high degree of efficiency attained by two branches of the Government in their efforts to serve the business men of the country who are engaged in export trade rapidly and thoroughly. The Bureau of Statistics, a part of the Treasury Department, has attained under the direction of Mr. WORTHINGTON C. FORD a standard of accuracy, completeness, and, above all, promptness in compiling and publishing returns regarding our foreign trade that is without a parallel. In statistics such as these, covering as they do business transactions in a thousand articles of commerce entered at points widely separated, anything approaching immediate returns is obviously impossible. But by an altogether admirable system of preliminary sheets giving advance estimates of the more important items, followed by bulletins giving portions of the returns in detail, and finally a series of monthly summaries giving in full the statistics bearing on our foreign trade, together with much other valuable statistical matter, this bureau succeeds in presenting to all who are interested a continuous series of statistics corrected up to the date of publication and covering all transactions up to the beginning of the preceding month.

The Bureau of Foreign Commerce, a branch of the Department of State, Mr. FREDERIC EMORY, Chief, has been developed to an equally high degree of efficiency. This bureau now issues daily advance sheets of the consular reports, intended especially for newspapers, boards of trade and manufacturers, who are thus enabled to obtain the reports in full with the least delay. These advance sheets are reprinted in the form of monthly consular reports, and these in turn are printed in bound volumes at the end of each year entitled Commercial Relations. This bureau also publishes each quarter a volume giving the exports declared for the United States at the various consular offices for the preceding three months, and numerous special consular reports, many of them exceedingly valuable. While England, Germany and perhaps one or two other European nations surpass us in the volume and value of the commercial information furnished by their consuls, we believe that no government has a more perfect system of publicity by means of which the information obtained by its consuls and the commercial statistics compiled by its Treasury officials may be made of immediate benefit to all the citizens to whom it is of interest than that provided by these two bureaus.

### GERMAN EMBARGOES OF AMERICAN AGRICULTURAL PRODUCTS.

ON another page we print several official reports from our diplomatic and consular representatives in Germany regarding the recent extraordinary decrees of the German imperial authorities with reference to our fresh fruits and their subsequent radical modification in response to the protests of Ambassador WHITE. Germany appears to have entered upon a settled policy of covert hostility to American food products, of which this latest attempt to keep out our fresh fruit is merely an incident. The echoes of the controversy over the admission of our pork, beef and canned meats has not yet wholly died away, although the German charges that the first was infected with trichinæ, the second with pleuro-pneumonia and the last were poisonous have been so often disproved as no longer to be seriously advanced by any one. An attack was made in Germany on American hay some years ago on

the ground that it contained the seeds of noxious weeds. This apparently fell through immediately, for no official notice was ever taken of it. More recently there has been an outcry against American-cured hams on the ground that we use too much boracic acid in our curing process. A consular investigation at Hamburg developed the interesting fact that we use considerably less than the German formulæ call for. As lately as February of this year German officials have publicly intimated in the Prussian Chamber of Deputies that the importation of American horses might be prohibited without quarantine owing to the alleged prevalence of influenza among the stock imported from this country. We print elsewhere a consular report describing a municipal attack upon American dried fruit on the ground that it contained traces of zinc from having been dried on zinc trays. The inference would, of course, seem to be that wooden trays were used in Germany. One of our consuls, however, visited the agricultural exposition then going on in Germany and reported that all of the fruit evaporators exhibited, about fourteen in number, were fitted with the alleged harmful zinc trays, which were freely used in Germany.

The latest attack on fresh fruit, on the ground that it contains the San José shield louse, has every appearance of being another move in this ingenious but unprincipled campaign against all American agricultural products. That the imperial authorities have so promptly withdrawn from their original position shows conclusively that they felt themselves that it was untenable. The amount of the trade involved in these German decrees is not sufficient to cause any concern. It is perhaps a five-thousandth part of our total export trade and a very small fraction indeed of our export trade in fresh fruit alone that is affected. But we are very much interested in the spirit of hostility that is behind these attacks. There can be no doubt that this attitude of the German imperial and municipal authorities is dictated by a regard for the interests of the agrarians who are a very influential body in German politics, coupled, perhaps, with a desire to get back at the United States for the supposed injury done to German export trade to this country by the Dingley tariff. Indeed, more than one of our American contemporaries have suggested that the real germ that makes our fruit, our meats and the rest so injurious to the German stomach is none other than the Dingley bug.

Undoubtedly the agricultural classes throughout the German Empire are finding American competition more or less severe. But if the government wishes seriously to protect them why does it not do so by means of a protective tariff bearing equally against all alike? Doubtless one reason is the desire not to offend Austria and Russia. A treaty giving this country the benefit of "the most favored nation clause" prevents a tariff discrimination aimed at us alone. The scheme of formulating restrictions based on alleged sanitary grounds offered a convenient means for accomplishing the result of a discriminating tariff without breaking the letter of this treaty.

But with all respect to the ability of the German Government officials it seems to us that the experience of the past ten years should convince them that this policy has been a mistake. In effect, in order to keep our products out of their own markets they have attacked their reputation in every other. Had the charges made been substantiated the trade in American agricultural products throughout Europe undoubtedly would have received a deadly blow. But no more conclusive proof of the fact that every people in Europe, the people of Germany included, regard the various official slanders mentioned above as false could be adduced than the fact that our exports in every one of the lines attacked has grown by leaps and bounds. In Germany alone, for example, the imports of American horses have swelled in four years from \$80,000 to over \$900,000. If people who buy American horses are finding that they are not worth the price charged it is highly improbable that each year would see three times as many sold as the year before.

As the tables prepared by our Consul-General at Berlin, printed elsewhere, conclusively show, Germany is exporting more under the Dingley tariff than before, her exports for the calendar year 1897 exceeding those for 1896 by \$4,922,556.39, while the exports



of sugar alone, about which there has been more uproar than about anything else, actually were \$756,122.01 greater than the preceding year. Obviously, therefore, there is not much ground for our German friends to talk about retaliation.

If the present agitation over fresh fruit brings out these two facts, that there is no need of retaliation and that the policy described above is not helping German agriculturists or materially injuring our own, with sufficient clearness to induce German officials to abandon their campaign of slander, it will have accomplished a very good result. If the United States were to institute a quarantine against German wines or to prohibit German sugar on alleged sanitary grounds there would be a great outcry across the water. We do not believe that such a procedure would help American wine or sugar men in the least and it would probably injure the German producers very little. But it would cause hard feelings that would sour trade relations between the two countries to the disadvantage of exporters on both sides. A similar policy pursued systematically by a number of nations would bring about a state of mutual recriminations, innuendoes and retaliations that would make international trade simply intolerable. It is Germany's ambition to become a great exporting nation—a most just and laudable ambition. She should be the last to engage in a policy that, if carried to its logical extreme, would render all export trade, her own included, impossible.

#### ABOUT FOREIGN CREDITS.

ONE of the first questions asked by all buyers when contemplating sending an order abroad is regarding the terms of payment. Upon the answer to this question the order in many cases depends. And too often, we fear, the order is sent to the manufacturer or trading house whose terms are seemingly the most liberal as regards the extension of credit, without due regard to the fact that credit, like everything else in the commercial world, must be paid for, and that in the case of foreign credits it frequently has to be paid for more than once and at rates greatly in excess of the intrinsic value of the service rendered.

It is well known that the traders of certain nations have a clearly defined policy of offering credit as a special inducement to win foreign trade. By means of local agents, whose business it is to investigate the character and standing of the houses with which they deal, and frequently with the added advantage of branch houses duly established under the laws of the countries in which the credit transactions are negotiated, they are enabled to do this with a minimum of risk to themselves. But even under these advantageous circumstances it is certain that the buyer must pay for his credit, if not specifically at least indirectly in an increased price placed upon the articles he buys.

But this is not all. Let us suppose that in addition to the advantage we have mentioned the buyer actually does not need credit but is tempted to let "this one" go on account since credit has been offered voluntarily. Notwithstanding the fact that both the risk and the accommodation have been reduced to a minimum there still remains a strong sense of obligation. The seller, without having deserved it in the least, is placed in the position of having conferred a favor, while the buyer is in the very undesirable attitude of appearing to be the recipient of the foreigner's bounty. This gives the seller an advantage that he is certain to avail himself of on occasion, and deprives the buyer to a considerable degree of his liberty of action. The agents of the credit house will not fail to remind him most unpleasantly about the "favor" shown him in the past, and he will probably feel constrained to purchase again of the same house even though convinced that his rivals who buy for cash are getting better or cheaper goods. Obviously this is paying again for his credit, and in a most costly and disagreeable way.

Another contingency that importers who buy on credit must guard against with especial vigilance is the danger from sudden business depressions at home. In a great many countries, in most colonies and new countries particularly, the fluctuations between extreme prosperity and extreme business depression are exceedingly

rapid and violent. No class of business men feels this so severely as that engaged in foreign trade in such countries, since a sudden depression frequently leaves them utterly unable to collect the sums due them from their local customers, or to dispose of the remainder of their stocks until a successful crop or some other fortuitous circumstance turns the tide of fortune the other way and prosperity returns as abruptly as it had departed. At the worst the cash buyer finds himself obliged to limit his immediate purchases and to take every reasonable precaution with a view to the prompt collection of his accounts and a speedy renewal of his stocks when the good times return. But the credit buyer runs a very serious risk either of being forced to the wall altogether or of being reduced to the absolute necessity of purchasing on credit for the future.

If an extension of credit is really necessary or desirable the buyer will do far better to obtain it at home where he is known, and where his reputation and the value of his collateral will secure for him a lower rate than they possibly can in a foreign land. In this way he at once avoids the entanglements and risks that we have just mentioned and at the same time secures the benefit of cash prices. It is sometimes possible for buyers to take advantage of what is known as the *del credere* system—some local exporter or importing commission house, having a credit in the country where he wishes to order his goods, or well known there, guaranteeing his payment in consideration of a moderate commission. In this way they obtain immediate shipment of their goods, the seller being amply secured by the balance to the credit of the house guaranteeing the account. The transaction thus becomes essentially a domestic one in both countries. In addition to its other advantages the *del credere* system occasionally enables the buyer to escape the loss arising from an unfavorable rate of exchange since he makes no remittance to the seller direct.

It is a good rule, that of the humorist, "Don't run into debt if you can find anything else to run into." In all trade, domestic or foreign, those who pay as they go have every advantage over their less fortunate or less prudent rivals. None the less credit will always be asked and given, and undoubtedly the trade of the world would go on far less smoothly if credit ceased to be a well recognized factor in trade. But we repeat that foreign credits should be avoided as far as possible, and above all any entangling credits with the foreign seller or manufacturer. Those trading houses that have made the giving of credit a part of their regular policy are shrewd, no doubt, in doing so, but the buyer will do well to compare their goods and prices with those of the houses that sell for cash only and then carefully estimate the cost, to him, of the credit so voluntarily offered. Those manufacturers whose sole business is making as well, and selling as cheaply as possible, are naturally suspicious of the buyers who ask for credit abroad when, if their intentions are honest and their collateral is good, they can obtain it much more cheaply at home.

WE understand that on June 30th, the appointment of the Director *pro tem.* of the Bureau of American Republics will expire, and that it will then be the duty of the Executive Committee of the Bureau to appoint a permanent Director. No doubt the real choice will be left, as heretofore, to the Government of the United States, and everything will depend upon the decision of the Administration, not only as to the fitness of the various candidates for the position, but regarding the present policy of the Bureau and the advisability of continuing that policy or, perhaps, of abolishing the Bureau altogether. THE AMERICAN EXPORTER, while opposed to the present methods of the Bureau, would be glad to see it placed upon a satisfactory business basis and enabled to perform, without prejudice to any of the citizens of this country, such services as it properly may in behalf of American export trade. Among the many candidates for the permanent appointment as Director, we note the name of CHARLES E. LOCKE of this city. Mr. LOCKE is an able man, is widely known to American manufacturers and exporters, and we should be glad to see him secure the position if we could be assured that he would modify the policy of the Bureau in the manner above suggested.



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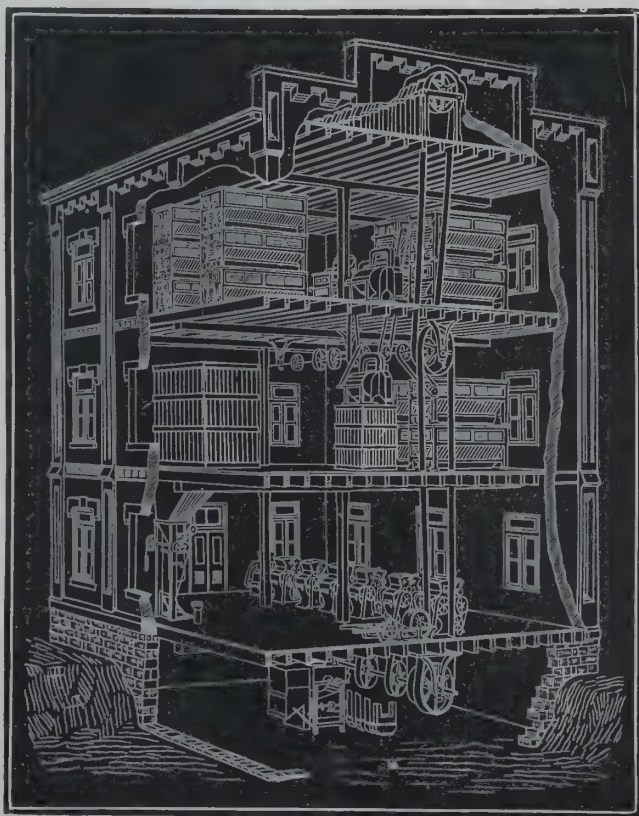
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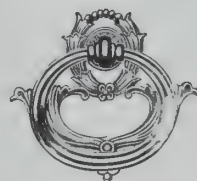
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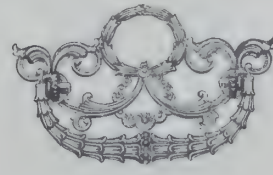
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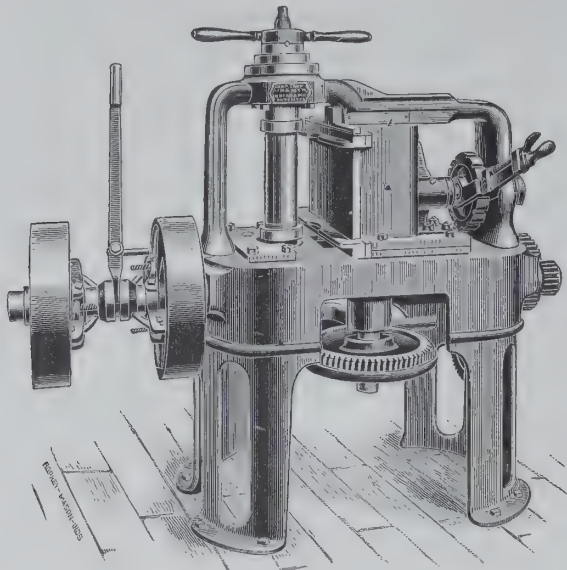


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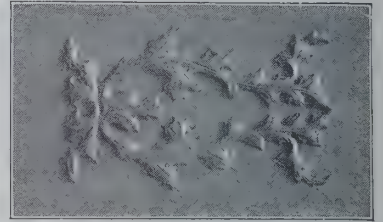
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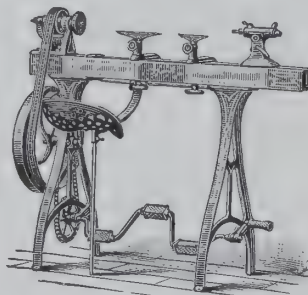
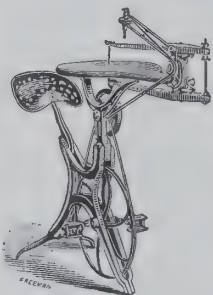
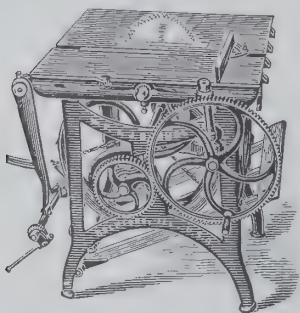
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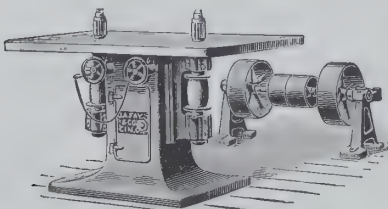
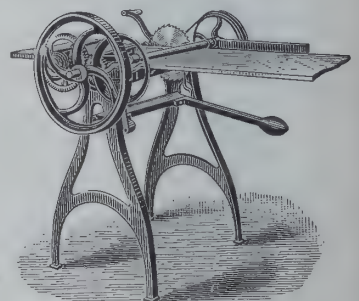
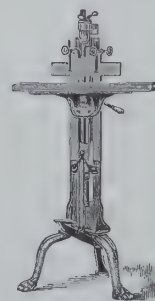
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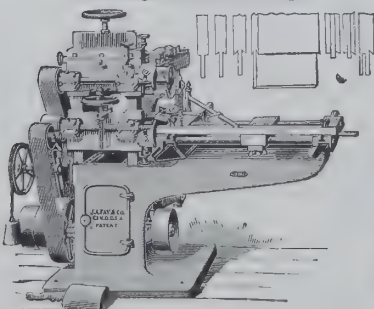
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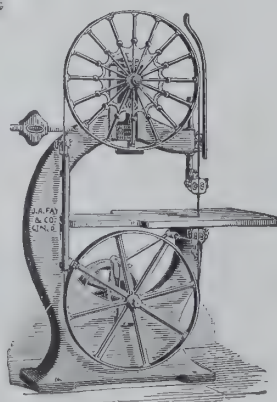
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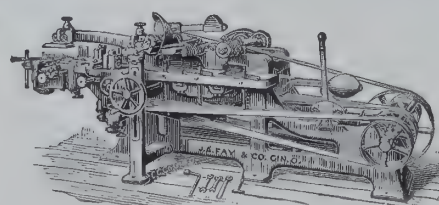
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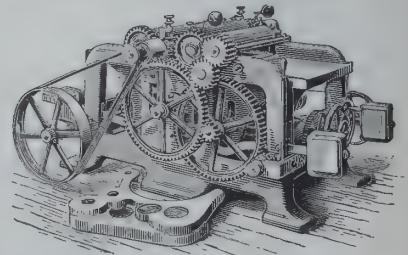
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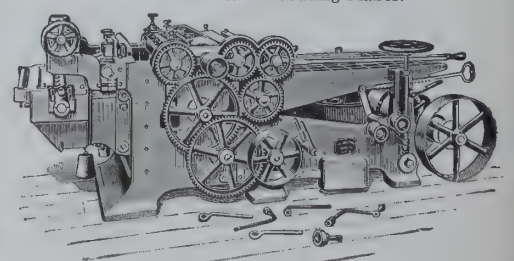
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Devoted to the Foreign Trade in Machinery and Hardware.

## AMERICAN EXPORTS OF MACHINERY IN 1897.

FROM the official summary of exports from this country for the month of December, 1897, which has recently been issued, it appears that the total exports of machinery during the last year amounted to \$30,171,150. This stands in contrast with \$25,769,790 for the year 1896, and shows an increase of 17 per cent.

This large expansion in value is the more significant because 1896 was itself a year of such phenomenal foreign trade that a shrinkage following it seemed not unlikely. In the line of machine tools there were reasons for believing that a maximum had been reached in 1896, or the first part of 1897, and that the progress of the latter year would show a decline. It appeared to be a question of a short time only how soon Europe would be near its saturation point and orders become less frequent. In fact, the Spring of 1896 showed some indications that such was the case. From the present viewpoint, however, it appears that the American foreign trade in machine tools has held its own well in 1897, and not improbably has amounted to more in the last year than ever before. But this question can never with certainty be determined, because our Government has only lately recognized the great importance of metal-working machinery as a factor of commerce, and did not, therefore, begin their separate classification until the first of the present fiscal year, which commenced with July, 1897.

The exports of metal-working machinery for the half-year from July to December, 1897, inclusive, were \$2,040,888. At the same rate the amount for the year would be about \$4,000,000. This is a large sum, but the total for all kinds of machinery is so much larger that we cannot draw from it any reliable deductions as to the increase or decrease in this particular line. The entire list of machinery exported includes: Electrical, metal-working, printing presses, typewriters, pumps, shoe machinery, sewing machines, fire, stationary and locomotive engines and "all other," the "all other" comprising more than half the total. Some of these have been separately listed during the entire year, and longer. Among them stationary engines show a noteworthy increase from \$265,882 in 1896 to \$359,698 in 1897. This may be due in part to the large orders for foreign electric railway engines taken by a Western concern in this country, and we imagine that the valuation contracted for was greater than that actually shipped by the end of the year, so that there is enough left over to give the figures of 1898 a good start. The value of locomotives exported in 1897 was \$3,055,842, against \$2,980,278 in 1896, which is not much of an increase, but very satisfactory, if it be remembered how good a year for locomotive exports 1896 was. The number of locomotives, by actual count, increased more than did the value, being 348 in 1897 against 312 in 1896. Therefore the average export price of a locomotive in 1897 was \$8,781, while in 1896 it was \$9,552. This cheapening may be due to the engines shipped last year having been smaller or of an inferior grade, or it may be because competition in the export field has been growing more keen.

In an article upon British exports for 1897, published in the *American Machinist*, February 3d, locomotive shipments from that country were shown to have been \$5,062,935 (assuming the value of a pound to be \$5) in 1897, against \$5,389,115 in 1896. Although with them, as with us, the statements for the two years compared show but a trifling difference, that little is for them a decrease, while for us it is an increase.

The total British exports of machinery advanced to \$24,627,395 in 1897 from \$21,572,435 in 1896. This was an increase of 14 per cent. against ours of 17 per cent. They have done remarkably well considering their engineers' strike, but fortunately our increase is more rapid than theirs. It will be noticed also that our total is several millions ahead of theirs in actual amount, although this comparison may be misleading because the term "machinery" is a flexible one, and it is not certain that the English statisticians include under it all that ours do.

**What Machinery Does.**—If a clever mechanic, with no tools or materials but those which were available fifty years ago, were to-day to make a bicycle he would spend six months on it, and the product would be so costly that practically no market could be found for it. But at the present time a good

workman can turn out a hundred bicycles a year, and they are so cheap in consequence that everybody can and does purchase them.—*Hiram S. Maxim in Engineering.*

## Foreign Opinions of American Trade Methods.

A LONDON correspondent of the *Philadelphia Ledger* has a good deal to say of the business methods of American houses exporting to the colonies. "A short while ago a canvass was made by British agents as to the rise of American trade in Sydney and Melbourne. There seemed to be a consensus of opinion among the business men of those cities that American goods are gaining ground, especially in axes, saws, shovels, files and in fencing wire and ammunition. They are gaining ground because their wares are well packed and because of superior quality and finish. American barbed wire is quoted there much cheaper than the English wire, while cartridges from the United States are preferred because they are cheaper and are put up in better style. In bolts and nuts all small sizes made up to three eighths inch can be had cheaper from America than from England. The taste for goods in Sydney, N. S. W., has, it is said, become quite "Yankeeified," and English importers have not catered for the market in a proper way. One leading merchant of New Castle, N. S. W., says that all American tools and shelf goods are up to date and, in many cases, better and lighter than the English goods.

"I might say a good deal on the subject of American packing, but space does not permit on this occasion. Of course, it is possible to get an article badly packed from an American house, but it is quite the exception. Not very long ago the Consular Department at Washington received replies from all parts of the world on this very subject, and the gist of nearly all of them was that American packing was impossible to beat. The answers from Australasia were emphatic on this point. Indeed, your exporters have reduced packing to a fine art. Neat boxes containing the various articles, the use of wooden strips to keep the goods in place, and strong cases are employed to prevent any damage being done in transit. There are no clumsy paper parcels, moldy straw and broken goods to irritate the importer.

"Another advantage which American firms give is in supplying invoices in triplicate for shipping purposes, and, beyond all matters of office routine, the American has an immensely superior catalogue, all of them being well printed and illustrated, strongly bound and of a convenient size. If it is desired, the American exporter will print the importer's name on every sheet, and also give the importer's selling prices instead of his own, so that the catalogue can be widely distributed. It would be difficult, if not impossible, to get better catalogues of agricultural implements than those published by American makers. For instance, every separate part of a reaper or binder is illustrated and numbered, a code word is attached, and the importer's selling price inserted, so that in the event of a breakdown at harvesting the duplicate part can be quickly obtained by telegraphing a single code word, and the amount can be remitted by the same means.

"American exporters of agricultural implements are often willing to send an expert to travel through the colony, giving exhibitions to farmers, without any charge whatever to the importer, who, of course is largely benefited.

"It is, I believe, very rare indeed for an American house to refuse to pay a reasonable claim for breakage or to satisfy any other cause for complaint. Such an attitude does not pay, and our English firms will find this out when too late. I may quote one instance, typical of the way such matters are dealt with by American firms. An Australian farmer once wrote to an importer saying that a moldboard of a plow had broken. The American firm replied, saying it was the first case which had come to their knowledge of a board having broken through fair wear and tear, expressed regret for the occurrence and sent the farmer three new moldboards. The American houses say it does not pay to quibble with customers over such things, and they are no doubt right."

## The First Typewriter.

THE New York *Sun* reports that the inventor of the first typewriter is still living. It is not surprising to learn that he was a Connecticut Yankee. The first instrument was a home-made affair, and the inventor, according to this account, never reaped the reward of his great idea. This first typewriter was perfected about thirty years ago and received little encouragement from the scientists of those days. The machine did its work well, although in a slow way as compared with improved modern machines. The typewriter was first set up in a small melodeon case in New London. The type was worked with a keyboard. The machine was taken to various States and exhibited, when inventors, seeing the idea, set themselves to work, and the result was the modern typewriting machine in all its multitudinous variations.



## IMPROVED METHODS OF LUMBERING.

**B**EGINNING at the log cutting the felling that was formerly done with the axe is now performed with the cross-cut saw, and from 1 to 2 feet of timber saved at the stump, and in valuable timber, such as walnut, there is scarcely anything left to call a stump, the cut being made close down to the ground, and the time formerly consumed in cutting off is saved. Improved methods of loading, hauling and driving the logs to the mill have been introduced and the expense reduced to such a figure that coarser logs that were formerly left in the woods can now be used at a profit. At the present time the logs are put to the mill at about one half the cost per thousand of that of the earlier times. The 8 feet timber wheels or "carry logs" are rarely seen and would be a curiosity to the younger class of loggers. Their place is taken by trucks, broad tread log wagons, tramways, logging railroads, canals and various other better means of moving the logs.

But even greater improvements have been made in the saw mills. The old sash mill and the usual way it was run was a most wasteful method of making lumber. The sawyer thinking he must square the log in slabbing before commencing to make lumber failed to see that he was throwing away the best part of the log. The blade of the sash saw was thick and the spread wide, and nearly one-fourth of what was left of the log after slabbing went out into sawdust, in fact the engineer would sometimes send up word to "spread that saw out," as he was not getting enough dust to keep up steam, he having no idea of using any of the slabs for fuel, so they were thrown into the stream to get them out of the way.

The gang mill was the outgrowth of the sash mill, and while the sash saw has gone out of use the gang has been greatly improved and is still the most economical way of cutting lumber from some classes of timber. Saws as thin as fourteen gauge are successfully used in them. The "mulay" mill took the place of the sash to some extent and was an improvement towards economy, as the saw was thinner and with faster stroke and the help of the side edger made more and better lumber from the same amount of logs. About this time the circular mill was coming more and more into use, but not, it must be said, in the interest of economy. It served only to increase the quantity per day, as the saws were still thicker than the sash saws and the miss-cuts more frequent and were responsible for the greater part of the waste in timber in this country. There were, however, some improvements made in rotary mills from time to time. Great skill was acquired in their management, and the sawmakers, some of whom were practical mill men, discovered that the saw required to be "opened up" or tensioned to compensate for the centrifugal force in order to be stiff when in motion instead of when standing still, as was formerly the practice. With this increased skill on the part of the mill man and sawmakers came thin saws, and eleven and twelve gauge blades became quite common in the hardwood districts in the early seventies, and as thin as thirteen and fourteen gauge at the rim were used with large collars for cutting valuable timber. These thin saws were usually from two or three gauges thicker at the eye. They made quite a reduction in the sawdust waste. In the meantime a market had grown up for laths, shingles, chair stock, balusters and various kinds of small dimension stock made from the slabs, edgings, broken logs and other offal.

It remained for the band saw to bring the saw kerf down to a minimum. The band mill is not a new invention comparatively speaking, as inventors have been developing it since 1844, when Newberry in England first conceived the idea of a band of steel with teeth on one edge made endless and running over pulleys (or saw wheels as we call them now) for the purpose of wood cutting. It is hardly probable that he ever thought of cutting lumber from the log with a band saw, but it was used a long time for cutting out irregular forms, such as plow beams, wheel fellows and the outside lines of scroll work, before it was tried as a lumber saw. The credit of first successfully sawing lumber with the band saw is given to the Hoffmans, of Ft. Wayne, Ind., although Miner, of Indianapolis, with a mill of his own design (which he afterwards exhibited at the Centennial Exposition at Philadelphia), and some others with the London, Berry and Orton mills were close after the Hoffmans as successful band mill men. About the time the thin circular-saw craze was on, the band saw, in the hands of these men and others who had acquired the skill necessary to run them, was coming gradually into use in the hardwood sections, and the saw-mill machinery men began to build and improve mills for their use, and at present some of these machinery builders are making a specialty of them with an almost endless variety of improvements in wheels, columns, straining devices, guides, etc., gradually coming up from 6 feet wheels and 4-inch saws to 9-foot wheels and 12-inch saws, and even larger mills for the Pacific Coast's mammoth timber.

The white pine men rather hesitated to take hold of them as they were too slow to produce the quantity desired, but this objection was overcome by the thicker and wider blades, and at present the band asks no odds of the rotary for speed and is far ahead in quality and economy of product. The band resaw is fast coming into use in the saw mills, and put behind the main band mill to resaw the planks from it into thinner lumber is an efficient means of reducing the sawdust waste and increasing the output of the mill, as very thin saws can be used. I think to Mr. Egan, now of the Fay-Egan Company, is due the honor of first introducing the band resaw into the saw mill, although other firms were quick to see its merits, and with improvements in saws, wheels, rolls, guides, etc., are making a great success of it. The slab resaw is also another waste saver that is being put into first class mills and reclaims quite a lot of lumber suitable for slack barrels, headings, packing boxes, picture backing and all places where short, thin lumber is used, and it is claimed that greater value can be obtained from the slabs by this means than to put them into laths, etc. Until a comparatively short time ago the planing mill was an entirely separate business from the saw mill, and used the best grades of lumber only, but it is the practice now to run planing mill and packing box machinery in connection with the saw mill, and work up all the low grades of lumber even down to the mill culls, and thus a large quantity of material that once went to the burner is now worked into salable stuff of enough value to bear shipment to the markets, as a good demand for the upper grades of lumber is nearly always maintained, and by this means the whole product of the mill is made available. Space will only admit of the mere mention of the wood-pulp industry that utilizes immense quantities of wood that would otherwise be fit only for fire wood. Some factories in reach of the white-pine mills use many car loads of the end trimmings of the saw mill and produce the paper on which our newspapers, books, etc., are printed, so that the lumberman and the editor are not so far removed as might be inferred at first glance.—*The Tradesman*.

## American Promptness in Filling British Orders.

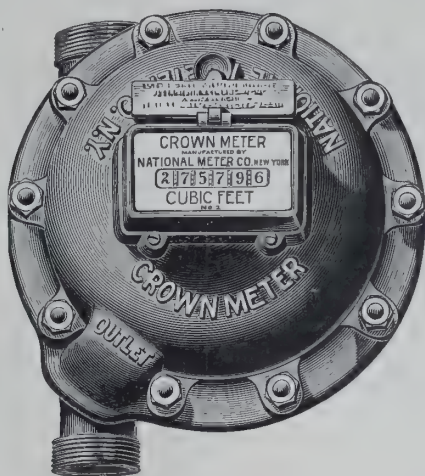
**O**NE of our most enterprising manufacturers informs me that he has tried various local firms, by which he means Sheffield and some thirty miles around, for certain kinds of malleable castings, but that he can neither get the quality he wants nor the quantity he needs, while within a few days he can have both from the United States. Going into his works the other day his staff showed me several of the English made goods side by side with those of the United States, and although Englishmen themselves, with an Englishman's prepossession in favor of English goods, they frankly confessed their preference for the foreign production. In his establishment I saw piles of American-made files, a line in which Sheffield had been believed to be unapproachable. These were rather lighter than the home make, but there is no mistaking the quality of the work upon them, and in several sorts they could not be produced, I was informed, on this side. The same manufacturer told me that recently he cabled out an order for a considerable quantity of material which was wanted in a hurry. He got a reply saying that it would all be shipped by the next home coming White Star steamer. In other words, within nine days of his cable from Sheffield the goods he was in want of would be in Liverpool. He further cabled for sixty electric specialties required for certain railways in this country. These were promised in fourteen days. "I should like to know," he says, "where in this country I could get such smart attention." "Remember," he adds, "these electric goods thus hurriedly cabled for are not in stock; all have to be made." I am afraid that a good deal of trade which ought to be done in England is lost from such causes as this.—*Sheffield Letter to The Hardware Trade Journal*.

**Steel Cars for Freight Trains.**—Steel freight cars with a capacity of 100,000 pounds and even more will eventually displace the old style of wooden cars carrying from 40,000 to 60,000 pounds. These cars are said to lessen materially the dead weight hauled and in many other ways are more economical than the wooden cars.

The Pittsburg, Bessemer and Lake Erie road has contracted for 660 all steel cars of 100,000 pounds capacity, the Pittsburg and Lake Erie has ordered fifty similar cars, while another trunk line is said to be figuring on the construction of cars to carry 100,000 pounds. All these cars are specially intended for the coal and ore trades. The large packing houses in the West have been using extra large cars to transport their goods to the seaboard, and whole trains of these monster private freight cars are no unusual sight on the through trunk lines. It is thought that before long the railroads will turn their attention to building larger cars for grain and other commodities.



# Interesting Information for Water Works Officials about WATER METERS



They measure correctly the amount of water passing through a pipe.

**They increase the revenue,  
Restrict the waste,**

and assist in maintaining a uniform pressure in the water main.



We have many letters of similar character, copies of which we would be pleased to mail you.

## NATIONAL METER CO.

118 CHAMBERS ST., NEW YORK.

**The Largest Water Meter Manufacturers in the World.  
Over 189,000 in Service.**

[MARCH, 1898]

City of Highland Park, Illinois.

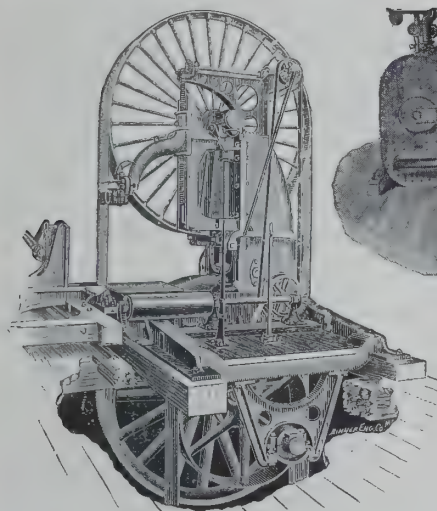
NATIONAL METER CO.,  
298 Broadway, New York.

GENTLEMEN:

Replying to your favor of the 3d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN.  
Chairman of Water Committee.



Band Mill.



60 or 100 horse power mill. Portable Saw Mills from 12 to 100 horse power.

## LUMBER MAKING MACHINERY.

THE MOST MODERN.

BAND MILLS—6, 8 and 9 foot wheels.

CIRCULAR MILLS—All sizes. Suitable for handling any size and kind of timber

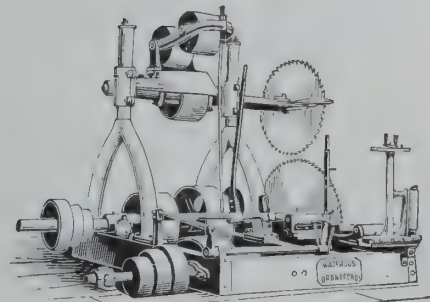
BAND RE-SAWS—For Saw Mills. Increase largely quality and quantity of daily output.

STEAM-ACTING SAW MILL APPLIANCES.

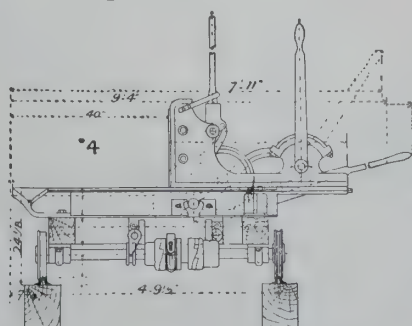
PULP WOOD MACHINERY.

BARKERS—With automatic turner; one man barks 15 cords, 10 hours

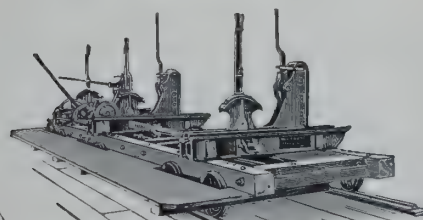
AUTOMATIC CUTTING-OFF SAW—2 men with this machine cut 60 cords of pulp wood 16 to 24 inches long, or 100 cords 48 inches long in 10 hours, taking logs from water and delivering cut wood to conveyor.



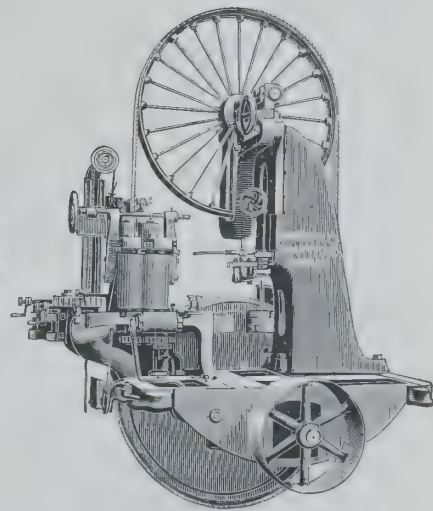
Saw Frame No. 3.



No. 4 Carriage, showing Off-set for Band Saw.



No. 5 Log Carriage.



Band Re-saw.



Established 1844.

New Works, 1896.

WET GRINDERS.  
WET MACHINES, SCREENS,  
WOOD CHIPPERS,  
CABLE and CHAIN ELEVATORS and CONVEYERS.

A successful experience of over 50 years is your inducement to correspond with and purchase from us. Long experience in the export trade insures satisfaction. Plans and competent men furnished. Address

## WATEROUS, BRANTFORD, CANADA.

Ask for Quotation and New Catalogue.

"LIEBER" and "A. B. C." Codes



## EXPORT NEWS IN THE CONSULAR REPORTS.

## UNITED STATES MANUFACTURES IN NEW SOUTH WALES.

UNDER date of Sydney, October 23, 1897, Consul Bell reports: The general outlook of business is more favorable; the seasons are better, the crops good, the tendency of general business is improving, and American dealers are surely enjoying a fair share of the increased prosperity. Without being able to furnish figures, I can congratulate our manufacturers on our increased trade in boots and shoes, hardware, paper, and in various light machinery and household utilities. Our manufacturers have secured the contracts for the machinery for the new street railways of Sydney, and have stipulated to furnish 2,000 tons of steel rails for the new railway lines. I regard this latter as an important matter.

People in Australia admire the lightness and finish of American goods, and I feel confident we should have a considerable trade in cotton goods. In drills and ducking, in standard sheetings, in towellings and common prints, we should certainly secure a good share of the Australian trade.

## AMERICAN SHOEMAKING MACHINERY IN SCOTLAND.

It is said that the shoe factories to be established in Scotland by a large corporation will be equipped throughout with American machinery of the latest description. Commenting on this announcement, the *Scotsman* (newspaper), of Edinburgh, says: "Some one may ask, 'Why American machinery?' The answer must be, 'Because it is the best.' In the invention and production of machinery for the rapid manufacture of boots and shoes America undoubtedly stands unrivalled." One important advantage claimed by the capitalists promoting these shoe factories is the cheapness of labor here as compared with the rate of wages in this industry in the United States.—*From report of Rufus Fleming, U. S. Consul at Edinburgh, January 4, 1898.*

## NEW LINE OF STEAMERS FROM DENMARK.

A new line of steamers between Copenhagen, New York and Baltimore has been started here, and the first steamer of the line, the *Venus*, leaves Copenhagen to-day for New York direct. The name of the steamship line is the "Danish Star Line." The *Venus* was formerly the steamship *Santos*, belonging to the Hamburg Südamerikanische Steamship Company, in Hamburg, and has been plying between Hamburg and Brazil. She is now under the Danish flag. It is not yet decided how many steamers the new company will put on the line.—*From report of Jules Blom, U. S. Deputy Consul at Copenhagen, January 7, 1898.*

## NEW ORLEANS-BLUEFIELDS STEAMSHIP LINE.

I have the honor to report that I am in receipt of a dispatch from Mr. M. J. Clancy, United States Consular Agent at Bluefields, Nicaragua, stating that a steamship company styled the "Bluefields Steamship Company, Limited," was recently organized in the State of Louisiana, with a capital stock of \$150,000. There will be four steamships employed between New Orleans and Bluefields—the *Hiram*, *Suidal*, *Sunniva* and *Alabama*.

The *Alabama* is a new vessel, and will make her first trip from Bluefields to New Orleans in February. She will be the fastest ship in the service and is expected to run from Bluefields to New Orleans, 1,210 miles, in less than four days. Her freight capacity and passenger accommodations will be superior to those of any other vessel on this route.—*From report of William B. Sorsby, U. S. Consul at San Juan del Norte, January 17, 1898.*

## DIRECT STEAMSHIP LINE TO INDIA.

A line of steamships has been established between New York and India, to touch at Bombay and Calcutta, of which Norton & Sons, of New York, are the agents. This will give our manufacturers and agents direct communication with India without transshipment, of which they should take advantage. If they will make the proper efforts, millions of dollars of additional trade with this country will be the result. I would suggest that, through the department, the attention of the manufacturers be called to this line, especially that of the manufacturers of railway supplies, locomotives, mill machinery, agricultural implements, bicycles, cotton piece goods, etc.—*From report of R. F. Patterson, U. S. Consul-General at Calcutta, January 5, 1898.*

## PROHIBITION OF AMERICAN FRUIT IN GERMANY.

A cablegram from the United States Embassy at Berlin, under date of February 1, 1898, informed the Department of State that a decree had been issued prohibiting the importation of American fruit. The department cabled an inquiry as to whether this decree applied to the United States alone; and also an instruction to the Ambassador to protest against the decree, and urge the injustice of its application to the large quantity of fruit in transit. Under date of February 4, 1898, Ambassador White replied that he had made earnest representations at the German Foreign Office, with the result that the original order had been modified; all dried fruit had been released, all fresh fruit in stock

was to be allowed to be sold, and the speedy release of the fresh fruit was promised. The original order, says the Ambassador, was sent by the Minister of Finance to the customs authorities, who acted with excess of zeal.

A decree has since been passed by the Imperial Council, adds Mr. White, prohibiting all fruit infected with scale insects; all living trees, plants, fruit waste, skins, etc., such as are exported for making jelly and the like; also packing materials commonly used in packing trees, plants and fruits. The insect referred to is the San José scale. The Foreign Office, continues Mr. White, insists on the good faith of the new regulations, and says they are prompted entirely by a desire to keep out the pest and are not intended to exclude competition.

A cablegram received at the department on February 11, 1898, from Ambassador White, of Berlin, says that the Consul at Hamburg reports that of 2,700 packages of fruit arriving by the steamship *Patria*, 81 cases of California Pears and Sonoma apples were stopped, all others being admitted freely. Of 1,400 packages received by the steamship *Pennsylvania*, and 2,600 by the *Lahn*, from Bremen, up to the 10th instant, only two small lots of California Pears and Sonoma apples have been stopped, although the examination of these 4,000 packages has not yet been finished. No charges have as yet been made for the examination. Only one more steamer, carrying about 900 packages, is due before the close of the season.

## AMERICAN DRIED FRUITS IN GERMANY.

I beg to call the attention of the department to the inclosed notice in the *Stuttgart Neues Tagblatt* of December 25, 1897, a translation of which I transmit herewith, relating to the prohibition of the sale and the seizure and confiscation of American dried fruits on the alleged ground that such fruit contains metallic zinc in such quantities as to render the same unfit and unhealthful for human food. I have not interviewed the city chemist, who is said to have made the tests, and I have as yet had no tests made. I have heard of no deaths or illness occasioned by the eating of such fruit, and it will be observed that the notice contains no statement that there has been complaint on that ground or, in fact, any other ground.

EDWARD H. OZMUN,

STUTTGART, January 11, 1898.

Consul.

NOTICE REGARDING THE SALE OF DRIED FRUIT (STEAM DRIED APPLE SLICES.)  
[Translation.]

Referring to the public warning regarding the sale of dried fruit containing zinc, published April 17th last, notice is hereby again given to those dealing in the above-mentioned article that repeated examinations of dried apple slices especially of American origin, by the chemical bureau of this city, have established the fact that samples taken from various retail stores of this city contained, almost without any exception, an addition of metallic zinc in quantities of 0.3 grams to the kilogram (2.2046 pounds). Among forty-one samples examined there were 12—29 per cent. containing zinc. The zinc contents appear to come from the fruit slices being dried on zinc wire netting. According to the opinion of the first city physician and other medical authorities, as well as the laws for articles of nourishment, any such articles containing zinc are to be condemned as detrimental to health. In consequence hereof all dealers in dried fruits are hereby warned that proceedings for punishment and confiscation will be instituted if further investigations of dried fruits should show contents of zinc.

WURSTER,

STUTTGART, December 21, 1897.

Chief of Police.

## Tin-Plate Statistics.

THE production of black plates amounted to 436,438,035 pounds, of which 377,588,412 pounds was lighter than 63 pounds to 100 square feet. The total production for the previous year was 334,014,798, so that the increase is more than 30 per cent.

Of the fifty firms reported as producing tin and terne plates, one only used foreign-made plates during a portion of one quarter, the amount being 57,208 pounds, out of a total production by the firm for that quarter of 213,687 pounds. Among the fifty-three firms reported during 1896, fifty used wholly American-rolled sheets and three used both American and foreign, with an aggregate output of 15,503,154 pounds.

Of this amount 4,226,523 pounds, or about 27 per cent., was made from foreign-rolled sheets.

The quantity of tin plates and terne plates imported into the United States in the last fiscal year amounted to 244,407,601.

In the same period the tin plate imported and manufactured for export amounted to 139,246,130 pounds. From the foregoing figures it is shown that the net imports were 105,161,471, the total domestic production was 446,932,063, the approximate domestic consumption was 552,143,534, and the average capacity of mills on June 30, 1897, was 600,000,000 pounds.—*New York Sun.*





Absolutely noiseless,  
Immediate and strong siphonic action,  
With a cistern valve that can be regulated  
for any discharge,  
Every part constructed of best known materials and workmanship

DESCRIBES THE

## MAELSTROM

Water Closet,

which represents the greatest improvement  
in sanitary appliances, made by

## OWEN & SALTER

MANUFACTURERS OF

**Plumbing Materials,  
Lavatories, Baths  
and Water Closets,**

12TH AND BUTTOWOOD STREETS.  
PHILADELPHIA, PA., U. S. A.

Send for illustrated catalogue.

## JAMES H. TARR,

MANUFACTURER OF

## Tarr's Celebrated Copper Paint

"Yacht Composition"

AND

"Green Racing  
Composition"

for wooden bottoms.

"Marine Iron" Paint

for the bottoms of  
iron or steel vessels.

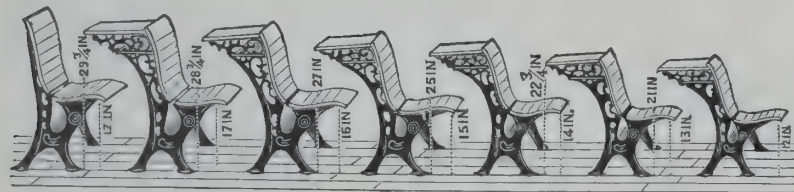
These Paints are acknowledged the best manufactured for their respective uses.

WRITE FOR CATALOGUE CONTAINING  
TESTIMONIALS FROM PARTIES WHO  
HAVE USED THEM.

Factory and Office, **CLOUCESTER, Mass., U. S. A.**

NEW YORK OFFICE, 41 WATER STREET.

Telephone Call—No. 763 Broad.



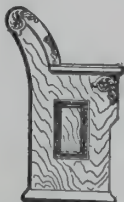
**SCHOOL DESKS** Sizes for pupils from 5 to 20 years of age. Price \$2 per desk upwards.



**THEATRE AND  
HALL ...  
SEATING**

◆ 100 Styles at \$1.00  
◆ each and upwards.

Goods in every civilized country  
of the Globe.



**CHURCH  
FURNITURE**

OF  
ALL KINDS

Seating at 50c. per  
linear foot upwards.

SEND FOR COMPLETE CATALOGUE AND PRICES,

THE LARGEST FACTORY OF THE KIND IN THE WORLD.  
OUR FURNITURE HAS MADE GRAND RAPIDS FAMOUS.

## School Furniture Co.

CABLE ADDRESS:  
"IRONWOOD GRAND RAPIDS."

GRAND RAPIDS, MICH.  
U. S. A.

**THE HARRINGTON & KING PERFORATING CO. CHICAGO.**

METALS PERFORATED AS REQUIRED FOR

# SCREENS OF ALL KINDS

FOR USE IN

Milling and Mining Machinery, Reduction and Concentrating Works, Woolen, Cotton, Paper and Pulp Mills, Rice, Flour and Cottonseed Oil Mills, Sugar and Malt Houses, Distilleries, Filter Presses,	Stone, Coal and Ore Screens, Stamp Battery Screens, Brick and Tile Works, Filters, Spark Arresters, Gas and Water Works, Oil, Gas and Vapor Stoves, Coffee Machinery, etc., etc.
--	---

STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK

Main Office and Works: No. 218 North Union St., Chicago, Ill., U. S. A.  
Eastern Office: No. 284 PEARL STREET, NEW YORK.

## C. A. WOOLSEY PAINT AND COLOR CO.

98, 100 and 102 Hudson St.,

**JERSEY CITY, N. J., U. S. A.,**

MANUFACTURERS OF

*Woolsey's Copper Best Paint,*

*Woolsey's Domestic Kalsomine,*

*Woolsey's Coach and Car Colors,*

*Woolsey's Wood Stains, Wood Filling, etc.*

### Copper Best Paint

FOR THE PRESERVATION OF THE  
BOTTOMS OF WOODEN  
VESSELS.

TESTIMONIAL.

From DEVONPORT FERRY CO., Ltd  
Auckland, N. Z., May 20, '91

To C. A. WOOLSEY PAINT  
AND COLOR CO.,  
Jersey City, N. J., U. S. A.

Gentlemen—I have great pleasure in recommending Woolsey's Copper Best Paint. I have used it on my Company's steamer for a number of years past, and it has given entire satisfaction. The Devonport Ferry Company's steamers "Britannia," "Victoria," "Alexandra," "Takapuna" and "Tainui" are now coated with Woolsey's Copper Paint over Metal Sheeting.

Faithfully yours,

ALEX. ALISON, Manager.

### "KALSOMINE."

Our Kalsomine is made of the best selected material and the tints and colors are particularly brilliant and clear. We are selling large quantities in the foreign markets with gratifying results. Send a sample order. You can make no mistake, for it is the best Kalsomine in the market.

### COACH

—AND—

### CAR COLORS.

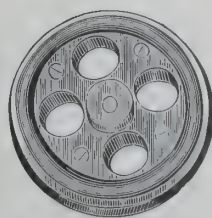
GROUND IN JAPAN.

TESTIMONIAL.

CHARLOTTE, MICH.,  
March 17, 1890,

C. A. WOOLSEY,  
Dear Sir:—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Greens are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

Yours truly,  
MAY & BARNEY.



## Rubber-Tired Wheels.

Replace wheels on your trucks with these noiseless ones.

## Hand Carts.

Write for 100-page catalogue of HAND CARTS  
TRUCKS and WHEELBARROWS.

## Lansing Wheelbarrow Co.

LANSING, MICH.

U. S. A.



FREE  
REPAIRS.



Original  
in every  
Feature.

### BLACK HAWK CORN SHELLERS.

Sold all over the  
Corn-growing World.

Beware of Imitations,  
and either order direct  
or through reliable  
Export Agencies.

MADE ONLY BY THE  
PATENTEE,

A. H. PATCH,  
Clarkeville, Tenn., U. S. A.



NEVER  
BREAKS  
OR FAILS  
TO DO  
GOOD  
WORK



### Trade with Denmark.

OF the Scandinavian nations Denmark has taken the most prominent and useful part in promoting better trade relations with us. The ministry of foreign affairs of that country has invited American exports by following a systematic and sagacious course conducive to our best interests. Through the medium of their Consular Service in this country their desire to encourage our exports to their country is laid before us and every means of assistance and co-operation are extended to us at the same time. Denmark is not a manufacturing country in any sense of the word, consequently she can well afford to draw the attention of manufacturers to the demands of her people, and in so doing a partiality is shown the Americans, not only because of the friendly relations existing between the two countries, but also because, our Danish friends say, the Americans produce the best goods.

Not only does Denmark propose having our goods brought into consumption by her own people, but she desires to handle the great volume of traffic which is to go beyond, on the Baltic. Copenhagen, the natural distributing point for all this trade, has at a great cost been supplied with every necessary means for the expedition of commerce at a minimum expense.

As a further evidence of Denmark's good faith in desiring to trade with us, several Danish steamship companies have established regular services between America and Denmark, and as these ships are necessarily compelled to come to this country practically in ballast we cannot but recognize the fact that they are not only asking us to open up business with them, but they are actually sending their ships to our shores that we may have direct and efficient means of transportation.

Less than three years ago the United Steamship Company, of Copenhagen, inaugurated a new service between New Orleans and Copenhagen. This move partook largely of the nature of an experiment, but the wisdom of such action was soon demonstrated by a most rapid growth of American export out of New Orleans, and the business has increased to such an extent that three large steamers have recently been built and added to the service.

In compliment to the Louisville Board of Trade, which has taken an active interest in the Baltic trade, the steamship company named one of their steamers Kentucky, and upon her arrival at New Orleans on her maiden trip last October the Board of Trade presented her with a handsome set of silk colors. This exchange of courtesies will serve to show the friendly relations existing between Denmark and the South.

The United Steamship Company is the largest steamship company in Denmark. This company owns a fleet of 150 vessels and these sail to all parts of the world. Recently this company, in connection with the United States Shipping Company, of New York, established a new service between Newport News and Copenhagen, the first vessel sailing from Newport News December 4th last.

Danish steamers also sail from New York, Galveston and other ports, thus giving the American exporter every facility in the way of transportation that could be desired. A most important feature of this transportation service is that a through rate of freight will be named by the railroads from any shipping point on its lines to Copenhagen or any Baltic port.—*The Tradesman*.

### Two Reasons for the Success of American Locomotives Abroad.

A GREAT reason for the favor shown the American machine over European builds arises from the plan of structure. An expert says that the essential difference between the American and English locomotive is in the frame or base upon which the whole structure rests. Each has been developed by the conditions which brought it into being. In England and on the continent the roadbeds of the railways are magnificent structures, very costly, but highly finished. The engines used on them are built on a plate frame, which gives great rigidity and endurance, and on well-constructed railroads such frames are very satisfactory, but on the badly ballasted and often ill-finished roadbeds which characterizes many American railways, especially in the South and West, the English engines would soon go to pieces. The American locomotives are built on bar frames, which, with equal strength, give greater flexibility. The weight of metal in the two frames is about the same, and the difference in power of resisting irregular strains makes the American engine superior in its own field.

Thus it has come about that in the colonial possessions of England and Germany and in other new countries, and those in which railroads are now being introduced, the American locomotive is superior, for the conditions in these

countries are much the same as those under which the American engine developed and which still prevail in many parts of the United States.

Another advantage our works have is in superior celerity in construction. In England or on the continent of Europe the works require nine to twelve months to turn out a finished machine. American shops seldom want more than two months, and they have built engines, and good ones, too, on rush orders, in a single month from the day the order was booked. Not long ago a test case was made to see in how short a time a locomotive could be built. On Saturday, June 22d, Robert H. Coleman ordered a narrow-gauge "American" type passenger locomotive and tender, which it was agreed should be ready for service on his railroad in Lebanon County, Pa., by the Fourth of July following. The boiler material was at once ordered and was received Tuesday, June 25th. The boiler was completed and taken to the erecting shop on Friday, June 28th, and on Monday, July 1st, the machinery, frames, wheels, etc., were attached and the locomotive was tried under steam in the works. The tender was completed the following day, Tuesday, July 2d, thus making the record of construction of a complete locomotive from the raw material of the art in eight working days. This superior promptitude has lately helped to get the American works orders for 400 locomotives for the great Russian Trans-Siberian line and its branches. None but American engines would stand that roadbed, and knowledge of this fact by the Russian government railway constructors has had its share in bringing the Russian patronage to this country.

### Aluminum.

UNDOUBTEDLY the most important use to which aluminum will be put will be for culinary and household utensils, being practically incorrodible. It is free from every form of poison and will not taint food; it is light to handle, and is a better conductor of heat than other metals. The recent announcement that contracts had been signed for the delivery in England of 1,000 tons of crude aluminum of American manufacture makes prominent the fact that this remarkably useful metal is now being produced in this country in large and constantly increasing quantities. Ten years ago no pure aluminum was manufactured in the United States, and in Europe it was produced at a cost that rendered it valueless to the mechanical world. To-day it is the rival, and successful rival, of both copper and steel. In 1896 the United States alone produced 1,300,000 pounds of the crude metal, a third of the total output of the world. In 1880 the market price of the metal was \$1 an ounce; to day it is less than 50 cents a pound. Aluminum is an exceedingly abundant element in nature. It is obtained in the form of an oxide of bauxite, of which there are large deposits in this country.

In 1890 there were only about 150,000 pounds of aluminum mined in the United States. Since that time the figures have been as follows:

	Pounds.
1891 .....	188,000
1892 .....	208,000
1893 .....	312,000
1894 .....	317,000
1895 .....	900,000
1896 .....	1,300,000
1897 (Estimated) .....	4,000,000

On account of its light weight, and yet at the same time substantial qualities, aluminum has largely superseded brass and other metallic compounds, and is sure to make itself felt with vigorous impress upon the world's commerce.

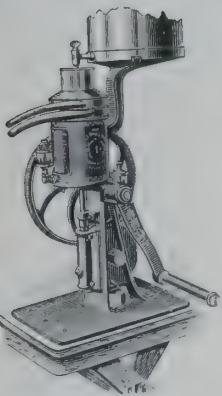
### Steel Rails and Speed.

ONE of the great advantages that the steel rail has conferred upon the railroads everywhere, says the *New York Times*, is an increased speed of trains, with a proportionate decrease of risk. Laid on a well made and solid roadbed, the best steel rails enable powerful locomotives to draw heavy trains safely at a rate of speed that would have been considered dangerous two or three decades ago. Were it not for the steel rails laid all the way between New York and Chicago the New York Central would not now be sending its daily flyer from one place to the other in twenty-four hours and the Pennsylvania railroad would not be experimenting with a twenty-hour train between the same points.

With the demand for greater speed on the railroads there has come a gradual increase in the size and weight of the rails. The first railroads in this country had rails that weighed 28 pounds to the lineal yard. Soon the weight of the rails was increased to 35 pounds to the yard, then to 41¼ pounds, next to 60 pounds, 75 pounds, 80 and 85 pounds, and 90 and 100 pounds.



# De Laval Cream Separators



Immediate and absolutely complete separation of cream from milk by machinery.

100,000 machines in use in every country in the world.

A saving of 10 to 20 per cent. in any climate, and 25 to 100 per cent. in warm countries.

Perfect separation and greatly improved quality of products.

Machines simple, durable and easily operated.

SATISFACTION GUARANTEED.

—PRICES, \$50 to \$225.—

Hand or Power. Any Capacity.

Address for catalogue or any desired particulars,

**THE DE LAVAL SEPARATOR CO.**

General Offices, 74 Cortlandt Street, New York.

# LIDGERWOOD HOISTING ENGINES

With New Improved Patent Friction Drum.

The "LIDGERWOOD" Hoisting Engines are strictly High Grade in every particular and accepted as the STANDARD Modern High Speed Hoisting Engines, both as regards High Duty and Economy, Durability and Simplicity, combined with Ease and Rapidity of Operation.

FOR PILE DRIVING, BRIDGE AND DOCK BUILDING, MINING, RAIL ROAD AND CONTRACTORS' USE.

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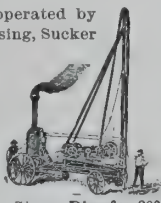
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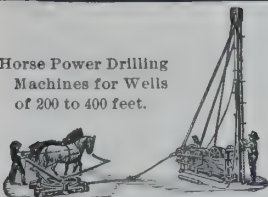


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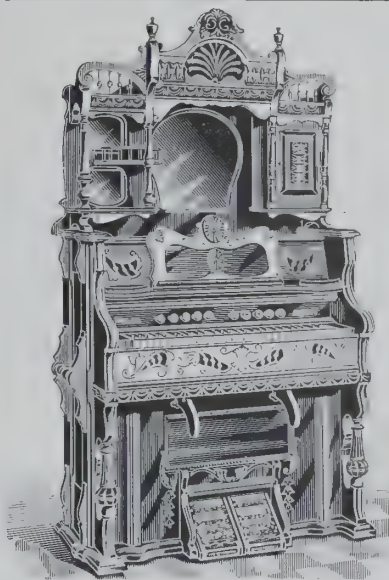
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### American-Built Japanese Cruisers Launched.

WITH ceremonies befitting the importance of the occasion there were launched in January at opposite extremes of the United States two sister warships for the Imperial Navy of Japan. One of these, the Kasagi, was launched from the shipyard of the William Cramp & Sons' Ship and Engine Building Company, at Philadelphia, Pa.

The Kasagi takes her name from a mountain in Japan, where, in the fourteenth century, the leader of the Hokucho, or Northern Court faction, was, with his followers, held at bay after a bloody war of sixty years or more, waged with the Nancho, or Southern Court. The followers of the Hokucho faction, though seemingly doomed to destruction, rallied, and after a fearful battle achieved a glorious victory.

The Chitose ("One Thousand Years"), the sister ship to the Kasagi, was launched from the shipyard of the Union Iron Works, at San Francisco, Cal. These two vessels, in general plan, are improvements upon the British-built Japanese cruiser Yoshino, which engaged in the recent war between Japan and China.

A description of the Kasagi will suffice for both vessels. Her length is 347½ ft.; breadth, 48¾ ft.; depth, 30 ft.; mean draught, 17 ft. 9 in.; with a displacement at that draught of 4,900 tons. In the specifications she is classed as a protected cruiser of the second class, and, like all vessels of her type, has no defensive armor, relying on her coal bunkers, which run 108 ft. fore and aft of her amidship section, to protect her engines, which are entirely below the water line. Above these is a protective deck, having a maximum thickness of 4½ in. on the slopes and 1¾ in. on the flat, giving ample protection to the vital parts of the ship. The motive power is supplied by two vertical, inverted, triple-expansion, four-cylinder engines, driving twin screws, and estimated to develop, under forced draught, a mean draught of 22½ knots per hour. The engines are of 17,000 horse-power, and the boiler-rooms contain twelve single-ended boilers 14 ft. 2 in. in diameter and 9 ft. 9 in. in length.

The batteries of the Kasagi are heavier than those on either the United States cruisers Minneapolis or Columbia, and it is alleged that the new cruiser, because of her superior protection, will have greater defensive and offensive power. There are no turrets on the Kasagi, but she will be quite well protected by guns. There are two 8 in. rifles at the sides, and her armament besides will consist of ten 4.7 in. quick-firing rifles mounted in broadside, a secondary battery of twelve 12-pound quick-firing rifles, and six 2½ in. Hotchkiss guns.

The launching was attended with several novel features not heretofore seen in connection with similar affairs at Cramp's. The decorations consisted of the intertwined red and white flags of the Mikado and the Stars and Stripes. Instead of breaking a bottle of champagne on the prow the christening ceremony consisted of the liberating of six gray pigeons. Ever since Japan had a navy the custom of liberating doves has been in vogue, and the release of these pigeons was to symbolize "the happy fruition of a great endeavor accomplished through the intercession of winged peace."

### A Large Drop Hammer.

A HARTFORD, Conn., firm has lately built for their own use what is said to be the largest drop hammer in the world. The principal business of this firm is the making of drop forgings, and of finished articles involving drop forging as a principal operation in their manufacture. The hammer, of course, embodies all the latest improvements that have been adopted by the makers.

The point which is considered of the greatest importance in the design of the hammer is in the weight of the anvil in comparison to the weight of the drop. The ratio employed by the various builders has been constantly increasing. While 6 or 8 to 1 was the rule in the early history of the drop hammer, later practice has been from 10 up to 15 to 1. The ratio of this hammer is 20 to 1, the hammer, which is of specially forged wrought iron, weighing 3,000 pounds, and the anvil 60,000 pounds. The total weight of the machine is 90,000 pounds.

It would seem that the purchaser of the hammer with the heavier anvil is really buying a much larger or more powerful hammer than the other, and paying for it only the additional cost of a certain weight of cast iron. It may be that different lines of drop work require this greater ratio more imperatively than others, as some makers of this line of tools offer their customers a choice of ratios: 10 to 1 or 15 to 1.

The anvil must undoubtedly yield under the blow of the hammer, and the lighter it is the greater must be the yielding. Not only is there a greater resistance in the larger mass of the anvil, but the foundation provided under the anvil also makes a difference. The firmer and more unyielding it can be made the better.

Especial care has been taken in the preparation of this foundation for the

large drop hammer here spoken of. The situation for it is perhaps exceptionally good. Hard pan, or primeval earth almost as unyielding as solid rock, was found at a comfortable distance below the floor level. On this is spread a thick bed of concrete of special composition, and above this are four steel boxes, also inclosing concrete, the weight of this entire mass being equal to the weight of the anvil block. The anvil itself is composed of three separate pieces, plane and with a carefully fitted tongue and groove at each joint. Between the bottom of the anvil and the carefully levelled top of the concrete is laid a sheet of lead ¼ inch thick, which will yield sufficiently to insure a perfect distribution of the load and shock over the entire mass.

The following are the principal dimensions and particulars of the hammer: Weight of hammer, 3,000 pounds; weight of anvil, 60,000 pounds; total weight, 90,000 pounds; bottom of base, 45x90 in.; length of uprights, 11 ft. 3 in.; width between guides, 18 in.; height from floor to top of pulleys, 16 ft. 9 in.; total height required above floor, 23 ft.; diameter of pulleys, 48 in.; face of pulleys, 10 in.; distance between pulleys, 48 in.; revolutions per minute, 80; extreme drop, 6 ft. 4 in.; shortest automatic drop, 31 in.

### American Armor for Russian Ships.

ONCE more, in her contracts with the Carnegie company for plating the Peresvet and Olysbia, two 12,840 ton battleships, Russia comes to America for armor. The price agreed upon is \$500 per ton, and while this is less than the sum paid under the last Russian contract, it is \$100 per ton more than the Bethlehem and Carnegie companies will charge our Government for the armor of the Illinois, Alabama, and Wisconsin.

The bids offered on the Russian ships are instructive. They came from leading English, French, German and American armormakers. The Vickers and Brown plates, both English, were offered at \$583.96 and \$569.38 per ton respectively. Of the French plates, the St. Chamond were offered for \$569 down to \$490, according to thickness; the Creusot, for \$569 to \$478.64; the Chatillon, \$563.50 to \$486, while the Marrel plates were also offered. Among the Germans, Krupp plates were offered at \$562.52 for all sizes, and Dillingers at \$559.80. The lowest bid seems to have been that for the Austrian Wilkowitz plates, which is reported at \$452.50 for all sizes, while our Bethlehem and Carnegie bids were each \$530.45 for all sizes.

Russia rejected all the bids, considering them, it is said, too high, and then made a bargain with the Carnegie company, which reduced its bid to \$500. Its original charge had been about what it received under its previous Russian contract, \$533.12.

But the price is not the only feature of this contract that deserves attention. Lately we have been hearing great claims for the new Krupp hardening process, which was said to outdo our Harvey super carbonizing, and to have figured in a Russian contract for the armor of the 10,950-ton battleship Poltava at \$542.64 per ton. Yet Russia returns to Harveied steel, such as our ships carry.

It should be remembered that both the Bethlehem and the Carnegie companies have obtained the right to use the Krupp process of hardening, but unless our naval ordnance authorities change their views they will stick to Harvey armor for our ships. There is, in fact, an additional reason in this new Russian contract to believe that American armor is unsurpassed.

### Electric versus Steam Elevators.

AT a recent fire in the city of New York another of the numerous advantages of the electric elevator was clearly brought to light and its presence might have avoided much loss of valuable property and the endangering of the occupants of the building. A number of tenants who were within some of the premises when the fire was discovered endeavored to seek safety by signalling for the elevator. The latter, which used steam as a motive power, was not running at that time, and was useless as a means of escape as it would have taken a dangerously long time to get up sufficient steam to put it into operation. The firemen, who could have made valuable use of the elevator by carrying their hose on it to the upper floors, were compelled to climb up a number of steep stairs with it in order to reach the flames. Life and property would be imperilled to a less degree if the public would realize the boundless advantages of the electric elevator, such as flexibility of operation, safety, and the rapidity with which it can be made ready for action. Besides, electric motors can be used instantly for pumps and hose. In European cities the use of elevators, or "lifts" as they are called in England, is much less universal than here, where from one to ten are installed in nearly every large building. But they are being introduced more and more, and too much care cannot be taken to secure the best,

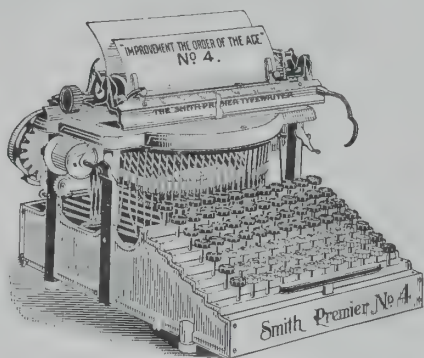


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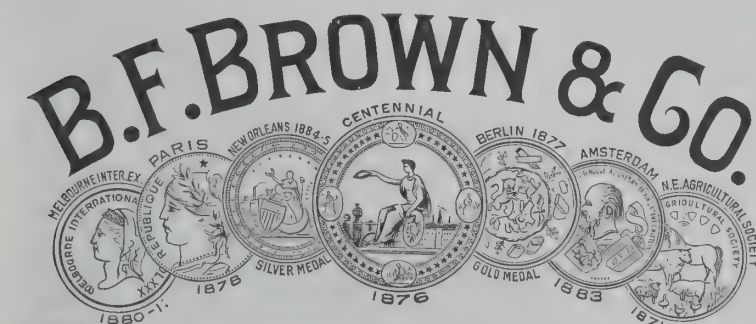
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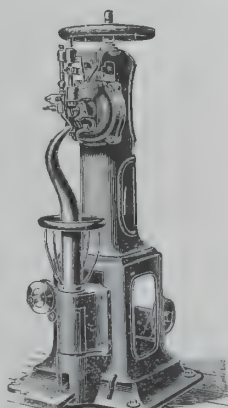
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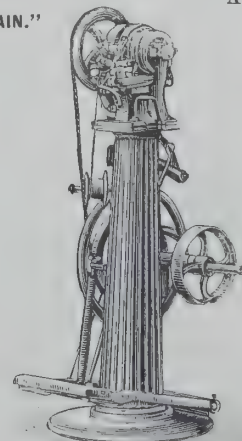
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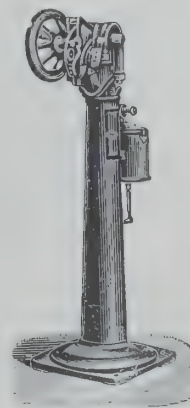
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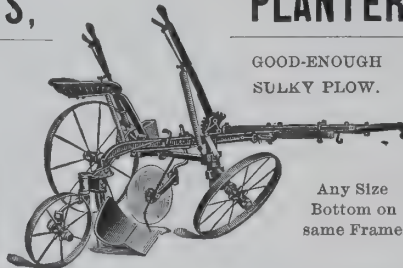
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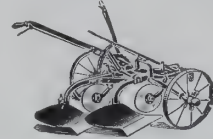


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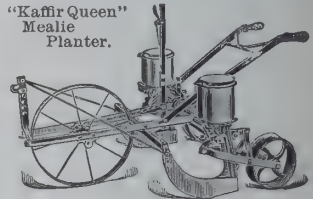


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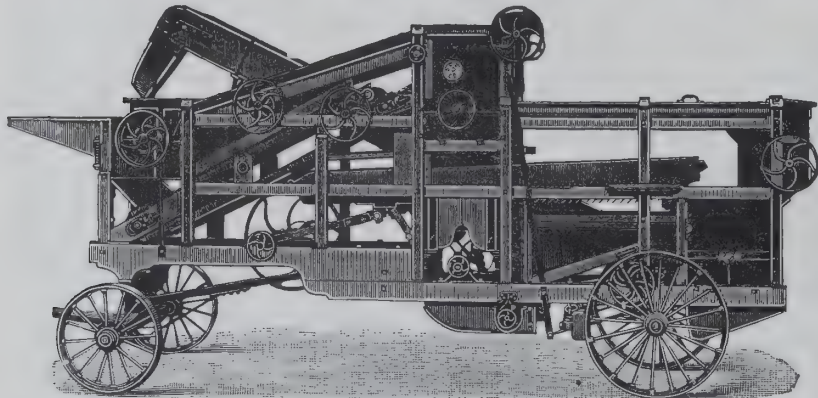
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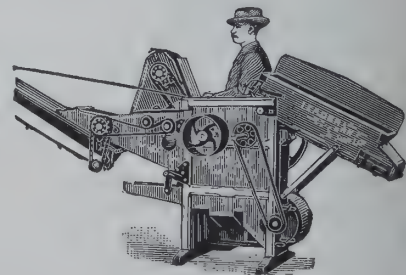
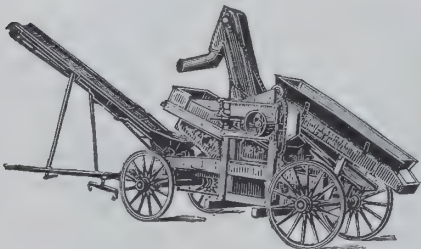
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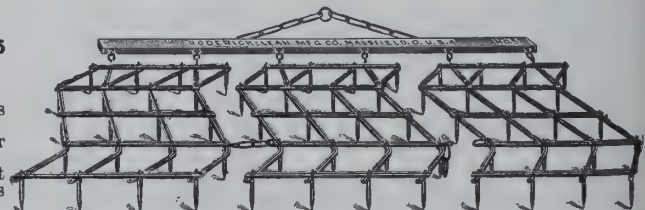
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## A History of the Origin and Development of the American Reaper and Binder.

(Continued from the February Number.)

AS early as 1850 the idea of binding grain by mechanical means was conceived, and two notable patents taken out, one in 1851 and the other in 1853, foreshadowed the automatic binder to such an extent that little was left but to perfect details and embody in it good mechanical judgment. It remained, however, for the great competition aroused by the success of the machine we have just been describing to awaken capitalists to the importance of the self-binding principle and its practical possibilities. So keen had the rivalry now become, and so numerous were the great firms that had given this problem to their ablest inventors, that successful types of self binders appeared in half a dozen places all over the country between 1871 and 1875. In all of these machines wire had been introduced to take the place of straw, which had sufficed when binding had been done by hand by laborers working on foot. The automatic binder once a success, rumors of war were heard, and soon another battle was on. To place the band at the middle of the bundle was an essential. The earliest patents had shown various means, and had stated that in order to meet the requirements the central placement of the band was necessary. A legal fight of ten years' duration, the case going ultimately to the Supreme Court, was necessary to determine the priority of patents covering the centrally binding principle. Binders using wire for bands, however, were doomed. The very first efforts of inventors had been directed to the use of twine for bands, and many had succeeded fairly well. Between 1875 and 1880 the rivalry of inventors was keen, but by the latter year the devices had all been perfected to a point that admitted of little further improvement. After 1881 no wire binders were made. The war that ended in the defeat of the wire binder was not a long one, and as the day of its supremacy was short few clamors are heard for the honor of having been the first to introduce it. Not so, however, with the twine binder, for, its success once established, the clash of arms began, and its echoes are repeated in annual circulars and advertising sheets. And here, again, the last to embrace it are now foremost in the clamor for the honors of its conception and development. It seems like the old, old story of the soldier last in the charge but foremost to proclaim his own valor.

The perfected twine binder followed the lines of the most successful wire binders of the day. A wire binder, for example, was invented in 1870 that produced for the first time bundles of uniform size. This improvement was universally adopted. The automatic clutches for tying the twine into knots presented a difficult problem to inventors, and the fact that several produced successful solutions speaks highly for the quality of inventive talent employed in producing these machines. The type of binder that came finally to be regarded as the most successful was so placed that its table would slope downward and outward, applied reciprocating packers and means for positively forcing ejection of the completed bundles. The many little devices necessary to the practical binder were eventually added. The machine from the start may be said to have been the embodiment of mechanical judgment, and to those who were so quick to see its merits must be credited decidedly good business judgment. Roller and ball bearings soon became popular, and are now used by nearly all harvester and mower builders. In 1879 the necessity of a suitable twine for binding became apparent. At first the twine used was made from the tow of American hemp, of which a sufficient supply could not be obtained, as there were only three small twine mills in the country supplied with the necessary carding machines to produce this twine. Nearly all the ropemakers in the country were visited in a vain effort to get a manila or sisal yarn that would serve the purpose. Finally, a manufacturer undertook to devise the exact type of twine desired, and with complete success. The machinery was so changed that a finer twine of single strand than had ever been produced from these fibres was turned out, and finally success was reached. The consumption of twine now amounts to 75,000 tons yearly. The modern self-binding harvesters are mainly so designed as to have the cutting apparatus extend to the left of the draught team. A change was made for the purpose mainly of conforming to the requirements where oxen are used, as in South America. Nearly all manufacturers of harvesting machinery now make both right and left hand

machines. The manufacture of American harvesting machinery has increased to such an extent that home consumption is fully satisfied, and its overflow has reached all the harvest fields of the globe. On the pampas of South America the action of the self binder and mower in harvesting the great fields may be likened to the buzz and industry of the bees. The South African blacks have mastered them. In the fields of Australia and New Zealand they have replaced the tattooed natives. Even in Finland and Alaska the mowing machines find a few weeks of work in each year in which to show their mettle. In England, the erstwhile manufacturing centre of the globe, American machines wear the blue ribbon.

## Corn Exports Still Breaking Records.

LAST year broke all records in the exports of Indian corn from the United States, but so far 1898 has beaten 1897 by about 2,000,000 bushels. At that rate the total exports of corn for the current year will exceed 200,000,000 bushels.

The total exports of corn for the calendar year were 189,127,570 bushels, as compared with 41,806,711 bushels in 1894; 61,956,638 in 1895 and 131,960,530 bushels in 1896. Of this great volume of export in 1897, the amount of 171,062,232 bushels went to Europe, as compared with 110,072,324 bushels in 1896.

Our Government has made every effort in late years to teach the people of England and the Continent the value of our corn. Large sums of money have been expended in the campaign of corn education and wise men have devoted years of their life to the work. Paid representatives of this country journeyed from nation to nation preaching the doctrine of corn. The Paris exposition was made the seat of operations for the conversion of Europeans to corn diet. But all to no avail. The good that was accomplished was little. It required a failure of Europe's wheat crop to demonstrate to foreign nations the wonderful possibilities of corn—to show them into how many forms of nourishing and palatable food it could be worked.

Great Britain and Ireland have been the heaviest purchasers of our corn, but experts assert that most of the shipments consigned to British ports were later sent to the Continent to be distributed over the length and breadth of the countries there.

The exports consigned to the United Kingdom in 1897 were 81,649,032 bushels, as compared with 57,169,336 bushels in 1896. Germany took 33,440,703 bushels in 1897, as compared with 20,268,004 bushels in 1896; France was a taker of 9,078,568 bushels in 1897, as compared with 5,021,757 bushels in 1896. British North America increased from 9,389,990 bushels in 1896 to 12,548,550 bushels in 1897, but other portions of America dropped from 8,588,119 bushels in 1896 to 4,673,522 bushels last year. The trade with Africa, which reached 3,748,720 bushels in 1896, fell to 693,704 bushels for the last year. The value of the corn sent to foreign markets in 1897 was \$54,007,152, as against \$37,836,862 in 1896. In the two years mentioned, the average export price per bushel declined from 37.8 cents to 30.6 cents. The exports of corn have thus far been chiefly in the form of grain. The shipments of corn meal, although showing a marked increase during the last few years, are still comparatively small. In 1894 they amounted to 272,885 barrels.

## Machinery and Modern Harvesting.

THE smallest implement upon a big wheat farm is a plow. And from the plow to the elevator—from the first operation in wheat farming to the last—one is forced to realize how the spirit of the age has made itself felt here and has reduced the amount of human labor to the minimum. The man who plows uses his muscle only incidentally in guiding the machine. The man who operates the harrow has half-a-dozen levers to lighten his labor. The "sower who goeth forth to sow" walks leisurely behind a drill and works brakes. The reaper needs a quick brain and a quick hand, but not necessarily a strong arm nor a powerful back. He works sitting down.

The threshers are merely assistants to a machine, and the men who heave the wheat into bins only press buttons. The most desirable farm hand is not the fellow who can pound the "mauling machine" most lustily at the county fair. He is the man with the cunning brain who can get the most work out of a machine without breaking it. The farm laborer in the West to day, where machinery is employed, finds himself advanced to the ranks of skilled labor, and enjoys a position not widely different from that of the mill hand in the East. Each is a tender of a machine.—William Allen White in *Scribner's Magazine*.



## HOW TO CARE FOR AGRICULTURAL MACHINERY

AS farm work is now so largely carried on by machinery, it makes it necessary that the farmer should be a mechanic, certainly so far as regards the skillful care of his elaborate machinery. It needs a large sum to provide a farm with an adequate stock of machines, and it is indispensable for common economy that the costly property should be duly cared for so as to lengthen its period of usefulness as much as possible. Generally it is not the use in the field during the working season that uses up a machine. It is in the idle time, when rust and dust do their evil work, that machines suffer the most. Edged tools, on account of the fineness of the cutting parts, are those most injured by neglect during the idle time of the year. Then the sharp, thin parts of the steel are corroded and worn away by the action of the damp air, the bearings are exposed to the dust and air as well, and the smooth surfaces are rusted and worn into rough grinding furrows, which cut each other, and still further wear out the machines, besides adding considerably to the labor of drawing and working them, thus increasing the work of the horses and causing waste of time in the work. It is now the off-season for farm work, and those concerned should not lose any time in examining their machines and tools, and not only clean them, but sharpen them, and put them in fit order for immediate work next season. The following suggestions may doubtless be a help in this direction, being drawn from experience and many years' practice.

As an instance of the advantage of good care of the machinery it may be said that a common mower, of a very antiquated pattern, has been, and still is, in active work, after the lapse of more than twenty-five years, during which the woodwork of that time has remained sound, and the metal work is still in excellent condition. The only wear to which this old fashioned machine has been exposed is that of the few days in the field in making the hay, and it shows how little of any good machine is worn by actual work that the time actually employed in mowing with the machine during a whole quarter of a century has not been much over one year of time in all. In fact, this ancient machine is good for as long again, the knives even being still in good condition without the loss or wearing out of a single section. This example is by no means singular. A machine maker has said to the writer of these lines that it is not the use, but the misuse, of farm machinery that fills the pockets of the manufacturers, who become rich on the money wasted by careless farmers. This will not do in these hard times, when incomes grow steadily less, and the prices of farm products keep down to so low a figure. Economy in every direction is indispensable to success in farm work, as much as it is in any other industry, at the present time more than ever before.

A water proof shed should be provided for the shelter of all the machines and tools of the farm. Everything of this kind should be kept in it; there should be places for everything, and all should be strictly kept in their places. Some covering should be procured as a shelter from dust, and before another week has passed all this costly property should be put in as good condition as if it were to be taken out for use the next day. The cutting parts should be ground and whetted, and then wrapped as far as may be in paper and dipped in oil. A newspaper should be cut in strips 6 inches wide, and, when oiled, wrapped spirally around every blade. All the bearings should be cleaned with kerosene and a bunch of soft rags, and then smeared with a mixture of clean tallow, kerosene and black lead. The oiling holes should be filled with plugs of wood to keep the dust out of the bearings; the painted work should be cleanly wiped over with a wet rag, and when all the rest that should be done is finished and the machine is in perfect order for work it should be covered or otherwise protected against dust. It goes without saying, or should do so, that the fowls should not be permitted to roost or harbor in the machine and tool shed. It should be kept especially for this purpose, and every possible care should be taken of its contents.

The plow needs equal care. The mold-boards are best covered with thick limewash, but before this is applied they should be well cleaned and polished as bright as new. The woodwork will be best protected by a coat of paint, and every bolt and screw about the plows should be tightened, and, if needed, a second nut should be screwed up tightly as a check against the possible loosening of every one of them. The same should be done with the harrows, and as far as possible these should be made of metal. Steel is now mostly used for all kinds of machinery for the farm, and is stronger, and, therefore, may be lighter than iron. Woodwork is altogether too perishable for farm implements, for the best of us cannot help but have these implements exposed to the weather at times, and with a coat of the red iron paint once a year the metal will last one's lifetime. The seed drills especially need care, more than any other of the farm machinery, for they must be largely made from perishable materials, and lightness is an important consideration in regard to them. Special care is to be exercised in the case of these, and the finer gearing on them calls for appropriate

treatment. So it is with the indoor machinery; the fodder cutters and the farm mill for grinding grain, which, while it is one of the indispensable aids to the farmer, yet is rarely seen where it might be made to save its cost frequently in a single year in the saving of grain fed.

The constantly extending use of machinery on the farm makes it necessary that the farmer should be something of a mechanic, and the young ones who are learning to take the place of their parents should not omit to study this branch of their business. For there is not a single tool or machine used—even the churn may be included in this category of farm tools and appliances—but needs the care and attention of a skilled mechanic, not only to save wear in them, but to use them in the most economical way as to the labor needed in their use. It is said a good mechanic is known by the condition of his tools. If this is true, why does not it apply with equal force and truth to a farmer? It does; and while the outer appearance of the farm itself is a test of the character of the farmer, it is equally so that the condition of the implements and machinery is a similar and justly applicable test.—*The Cable*.

## Another Development of the Combined Harvester.

LETTERS patent have recently been granted upon what is called the "single wheel harvester." This invention is described by the patent agents as follows:

"It relates to a novel apparatus for cutting, threshing, separating and cleaning grain in a continuous process by means of a machine which is adapted to travel over the field while carrying on the operation. What are known as 'travelling harvesters' have usually been constructed by mounting a threshing machine upon four wheels and hinging to one side of it a large triangular horizontal frame having a reciprocating cutter bar at the front to reap the grain, a horizontal travelling belt or draper behind the cutter upon which the cut grain falls, which draper carries the grain to and delivers it into the feed house, from which it passes to the threshing cylinder and thence through the usual cleaning mechanism. The difficulty with this class of machines lies in the fact that, as the threshing machine portion is supported upon four wheels, it must, unless some provision is made for levelling it, necessarily tilt from side to side as the machine passes over irregular and uneven ground, and this throws the grain to one side or the other of the cleaning mechanism and makes the separation and cleaning very irregular and imperfect. In this new construction the threshing machine has a single large bearing and driving wheel journaled nearly centrally inside the frame and a steering wheel approximately in line with it at the front, so that the threshing machine is carried upon these two wheels in line with each other. When it is properly connected with the header frame this connection will prevent it from tipping over. The connection between the two consists of a rack bar or equivalent bracing arm, one end of which is movable, so that the header frame inclines upwardly or downwardly in passing over uneven surfaces. The threshing machine can, by means of this connection, always be maintained nearly or quite vertical. Various mechanisms may be employed to make the connection between the two and to adjust it so as to keep the threshing machine level."

This form of machine was used with much success during the past season in hilly sections, and will be in great demand during the coming season where a medium-weight machine is required.

## Effect of Agricultural Machinery Upon Wages.

A WRITER in the *Cable*, London, says that in England sixty years ago the agricultural implements consisted simply of plows, harrows and rollers, though occasionally a heavy drag or clod-breaker, "and perchance a chaff box with a long hand knife" would be found on a farm. The farm tools of the time were hoe, scythe, hand rake and pitchfork. The weekly wage of a farm laborer through the summer depended much upon the price of wheat, as generally he received per week one bushel of wheat or its value and three shillings (nearly 75 cents) regularly, but this specific payment was cut down to two shillings per week through the winter months. With the introduction of improved agricultural implements in England the wages of farm laborers have increased. In this country forty or fifty years ago a bushel of wheat was quite generally the hire for a day's work in harvest; and here also the value of farm labor advanced as the use of improved or labor-saving machinery increased.

The reports that the Russian duties on agricultural machinery and implements were to be abolished or greatly reduced after the new year have not been verified. An official commission has favored the reduction of these duties, and their decision has been submitted to the Minister of Finance. The latter, however, has postponed consideration on the subject until next Spring.

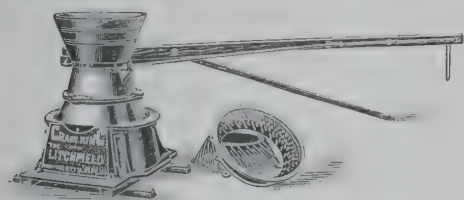


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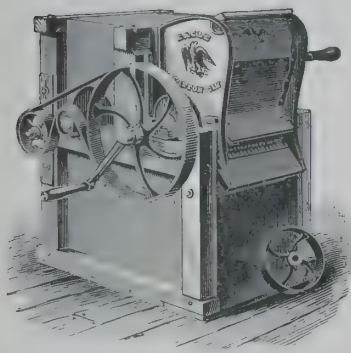
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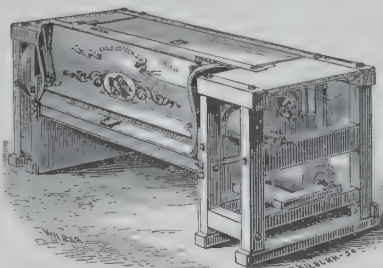
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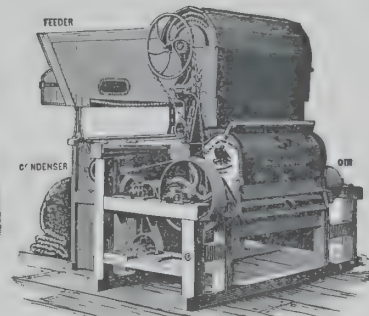
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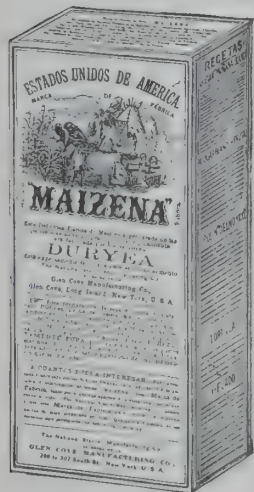
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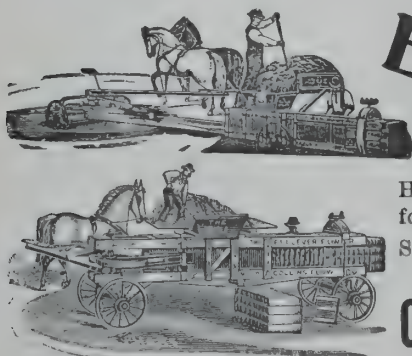
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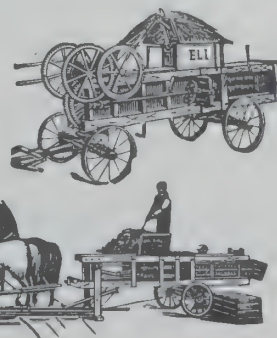
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### American and British Locomotive Building.

THE *Engineer*, of London, speaking not long since of the relative cost of American and English locomotives, displayed a lack of knowledge of American conditions, combined with a recklessness of statement regarding them, which are quite refreshing. We quote as follows:

"In the United States the great firms construct engines to certain standard patterns, and they say to the purchaser, 'There are half a dozen types from which you can choose; if you find nothing to suit you among them, then we must ask you to try some other maker.' One result is that it is possible to build to stock. The American builders live by their reputations; they are not troubled with any precise specifications."

Now, as a matter of fact, if there is any one thing which American locomotive builders bewail it is the constant and minute changes in specifications required by different roads. Formerly each locomotive builder had a type of engine characteristic of his works, very much as machine tool builders have to-day, and railroads selected that builder whose engines most nearly satisfied them. With the advent of the superintendent of motive power, individual preferences in matters of detail began to come in, until now locomotive works maintain complete blank specification forms in which are entered specifications regarding types of various details, materials and dimensions to the minutest degree. We were recently informed by the largest locomotive works in this country that they average a complete set of patterns for every five locomotives built.—*American Machinist*.

### The Big Combined Harvesters of California.

CALIFORNIA has become almost as famous for the production of wheat as of gold. Upon her great level valleys are located some of the largest farms in the world, and these are operated upon a scale not reached elsewhere. The great stretches of level or unbroken surface permit of the use of agricultural machinery of widest capacity and labor-saving in the highest degree; and—the dry climate being also favorable—such machinery has there been developed to the climax. In fact, the agricultural processes or operations and the systems of machinery employed in California are special and unique. Steam power is used in all seasons and for all purposes. Gangs of plows are hauled by traction engines, as also are gangs of harrows and seeders; but the greatest achievement with the use of steam or many horses and big machinery, is in harvesting.

On the slopes from the Rocky Mountains, and particularly in California, owing to the peculiarities of soil and climate, the straw of grain grows stronger and stiffer, and stands better than in the Mississippi Valley and the Eastern or Atlantic States. Steady dry weather thoroughly ripens the grain by harvest time, and, continuing through harvest, puts the grain in condition to be harvested and threshed in one operation, and gives ample time for this process without endangering the crop. Such conditions, therefore, and the immense even and unbroken fields, invited the use of combined harvesters and threshers and their construction on the largest scale.

About eight hundred have been built and put out in California, and it is estimated that they cut and threshed fully half of the wheat and barley crops of that state last harvest. Numbers of them also have been sent to and successfully used in Australia, Argentina and Mexico. They are built in various sizes, with width of cut from 14 to 24 feet, and even more, and for traction engines or horses according to size and orders. The average capacity per machine is estimated at 1,800 acres, the grain being cut, threshed, cleaned and sacked ready for market, all in one operation or process. On special orders some of these machines have been built with much greater capacity. One was described in the *Farm Implement News*, September 12, 1895, which took a swath 42 feet wide. They have also brought out a very successful side-hill combined harvester for use on rolling or hilly lands where the surface is ordinarily smooth. Its main feature is the arrangement by which the separator maintains a horizontal position, *i. e.*, is carried on a level, so that just as good work can be done on sidehills as on level ground. The economy in the use of these machines is evident. Besides the great saving of labor, there is a considerable saving of grain over the ordinary methods of harvesting, threshing and getting grain ready for market. It is estimated that on the average, with four men and twenty-four horses, one of these machines harvests and makes ready for market from twenty-five to forty-five acres per day—varying according to width of cut, the stand of grain and the kind of horses used. With the extra large machines and traction engines a greater acreage is obtained, of course; and it is also estimated that the cost of the entire process runs from 30 to 40 cents per acre; though this estimate does not, probably, include interest

on outfit and wear and tear. Undoubtedly, whenever the conditions—size of farms, surface and climate—will permit, this method of harvesting and preparing grain for market is by far the most economical and satisfactory.

### Electric Railways and Bicycles.

MAJOR I. B. BROWN, in making his annual report on the street railways of Pennsylvania, states that the receipts of the state's street railways have considerably fallen off within the past twelve months. He regards the use of the bicycle by both business people and pleasure seekers as the main source of the reduction in the traffic of many street railway companies. He finds that the cities where the hills are steep and less favorable conditions for bicycle riding exist the railway companies have not been affected by it to the same extent, but in many places it cannot be gainsaid that the bicycle has become a most formidable competitor of the street railway. In order to secure substantial confirmation of this view an observation was made in a leading street of Harrisburg about two months ago. The observation covered two days, from 7 in the morning to 6 in the evening. During that time 6,078 persons passed a given point 1,962 in the cars and 4,116 on bicycles, *i. e.*, 67.7 per cent. on bicycles and 32.7 per cent. on the cars, or more than two to one in favor of the wheel. The figures secured at Harrisburg are by no means exceptional. In the month of October the City Engineering Department of Rochester, N. Y., had occasion to collect statistics of street travel as a basis of estimating the wearing qualities of different kinds of asphalt. Men were stationed at the four points of the city where the traffic is largest, and a count made of the vehicles passing between 9 in the morning and 7 in the evening. At one point 1,146 bicycles were counted and 692 carriages; at another, 5,115 bicycles and 2,294 carriages; at a third, 7,041 bicycles and 3,571 carriages, and at the fourth, 2,883 bicycles and 1,894 carriages. Under the description of carriages were included all kinds of vehicles other than the bicycle.

### An Interesting Electric Railway Anniversary.

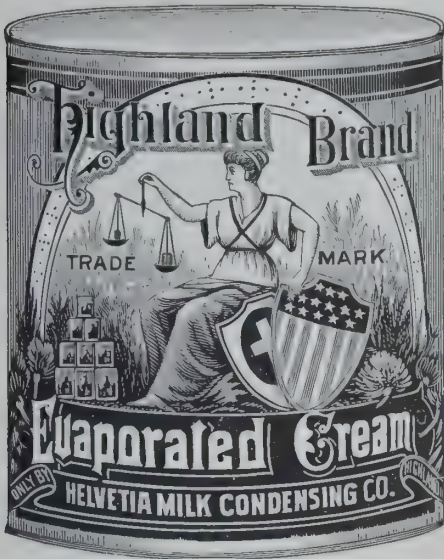
THE pace is rapid in electrical development. February 3d, ten years ago, saw the start of the Sprague electric road at Richmond, Va., an event which may be truly said to mark the beginning of the commercial development of electric traction by modern methods in this country. There had been a great deal of good work done before that time, both in Europe and this country, and a great many of the fundamental principles of successful operation had already been determined or put in practice. The work of such men as Short, Field, Daft, Henry and Van Depoele in this country particularly had made a deep impress on the art and is still there in living characters. But while inventive development had gone on so rapidly here, there had come a time when the "industry" had to take shape; a "psychological moment" when some things were to be rejected forever and others were to prove their vital fitness; an hour when capital could be attracted or again repelled for a long period, perhaps indefinitely. Mr. Sprague launched his memorable Richmond enterprise at this critical hour, and he won signally. The Richmond road was a great stride in advance—a dating point—and though it was far from perfect, capital at once recognized in its methods and in its thirty cars the actual realization of the successful modern street-railway system. To day that system with its 15,000 miles of road and \$1,500,000,000 of investment can look back over the long way it has come since Thomas Davenport first tried his little model sixty years ago, but it will now and always find the victory at Richmond one of the shining landmarks in its history.—*Electrical Engineer*.

### Our Trade with South Africa.

THE Philadelphia *Ledger* publishes an interview with a representative of the "Commercial Museums" of that city, who has just returned from a special mission abroad. He says:

"The prospects for the extension of American trade with South Africa and Australia are good. Business is improving very rapidly and Australia is quickly recovering from the recent depression. American goods are in favor in both countries. American shoes can be seen everywhere, and American hardware is making notable advances in competition with that from England. In South Africa there is no sentiment in regard to the purchase of goods. The business men of the growing countries of that part of the world buy where they can buy the cheapest and best. That is the reason why American mining machinery is found all over the mining sections of South Africa. The merchants of South Africa and Australia are a fine body of men. It is only the most energetic and enterprising who are willing to go into the new countries and make their fortunes, and the business men of South Africa and Australia belong to that class."





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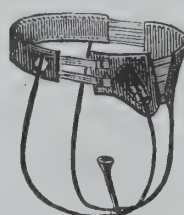
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Sold direct or through export commission houses.  
Correspondence solicited. Circular E on request.







OUR advice to dealers is to handle Bicycles that are mechanically correct in design—those that have all up-to-date features—no fads, but practical, new improvements that benefit both wheel and rider. Such are.....

**FRAME.**—Best quality of weldless steel tubing is used. Main frame, 1½-inch; head, 1½-inch; lower rear stays, ½-inch, D shape, tapered to ¼-inch; upper rear stays, ¼-inch.

**FRAME CONNECTIONS.**—Flush joints.

**SPROCKETS.**—Steel detachable, 20, 22, 24 and 28 tooth front; 8, 9 and 10 tooth rear.

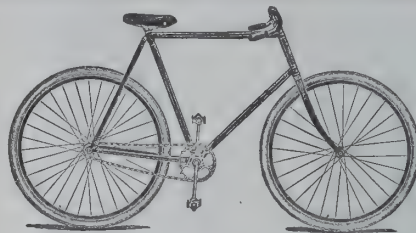
**HANDLE BARS.**—Steel adjustable.

**WHEELS.**—28-inch, fitted with steel piano wire swaged spokes.

**RIMS.**—Wood or steel.

## “Imperial Wheels”

REGISTERED TRADE MARK.



**BEARINGS.**—Disc adjusting, made from best tool steel, scientifically tempered and carefully ground to remove any roughness caused by tempering.

**BALLS** are kept in place by ball-retainers, which, in connection with felt washers, serve as dust shields.

**OIL CUPS** are provided, which convey the oil direct to the bearings.

**HUBS AND CRANK-HANGER.**—Barrel pattern.

**WHEEL BASE,** 43½ inches.

**WIDTH OF TREAD,** 5½ inches.

**CRANKS AND SHAFT.**—Two-piece, joined in center.

**FINISH.**—Black, maroon or green, plain or striped and decorated.

**PEDALS** are made rat-trap, so constructed that rubbers can be attached.

**CHAINS.**—Superior make, “B” block pattern, centers and pins hardened.

We also make **HIGH-GRADE TANDEM**s and **JUVENILE WHEELS**.

### LIST PRICES:

IMPERIAL MODELS, Nos. 38 and 39, - - \$75 each. IMPERIAL JUVENILE MODELS, 5 and 6, - \$40 each.  
IMPERIAL MODELS, Nos. 58 and 59, - - 60 each. IMPERIAL TANDEM, - - - - - 100 each.

**Special Discount to Reliable Dealers.**

Correspondence solicited.

**AMES & FROST COMPANY, “A” CHICAGO, ILL., U. S. A.**

Floor space occupies five and one-half acres. Capital invested in the manufacture of Bicycles, 800,000 dollars. Business established in 1869.



## Our Tribune Bicycles

## THE BLACK MFG. CO., ERIE, PA., U. S. A.

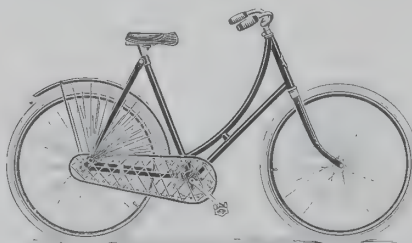
are known the world over for their excellent finish and reliable quality.  
Write for export prices. We deliver our machines properly boxed, freight prepaid, to New York City.



Tribune Model 33. Price, \$50.00.

Model 33 is a bicycle of excellent quality and finish, and far superior to many machines listing at higher price. The frame is weldless steel tubing of best quality, built in two heights, 23 and 25 inches; wheels, 28 inches diameter; gear, 73; cranks, 7 inches. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, gold striped, nickel trimming. Weight, about 23½ lbs.

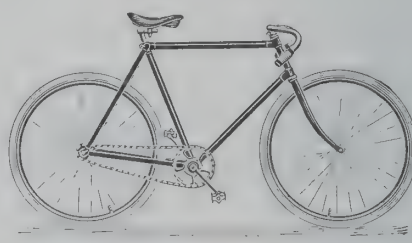
**ARENA MODEL M.** Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 34. Price, \$50.00.

Model 34 is practically the same as Model 33, excepting that it is built with drop frame, 20½ or 22½ inches, for ladies' use. Weight, about 24½ lbs.

**ARENA MODEL L** is very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.

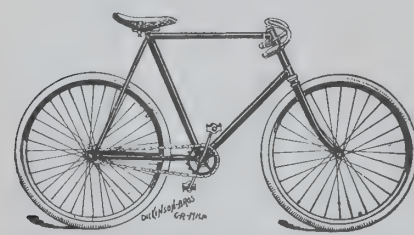


Tribune Model 350. Price, \$75.00.

Model 350 is built for road racing and for all purposes where a light wheel is desired. The frame is built in 23-inch height only. Drop to hanger, 2½ inches; 7-inch cranks; Tribune special single-tube racing tires. Weight, about 21 lbs. Finish, black, gold striped.

**We build also a large variety of higher-priced wheels, including TANDEM, TRIPLETS, ETC.**

Handsome illustrated catalogue describing our full line, MAILED FREE.



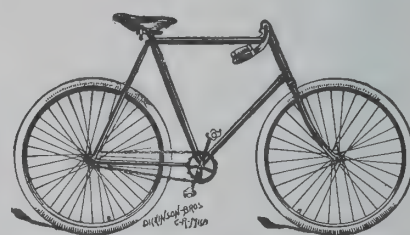
Halladay Roadster, \$100. Discount, 45 per cent.



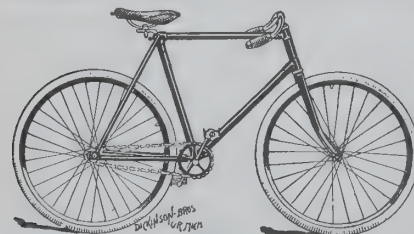
Lady Halladay, \$100. Discount, 45 per cent.



Lady Aetna, \$75. Discount, 50-5 per cent.



Aetna Roadster, \$75. Discount, 50-5 per cent.



26-inch Boys' Aetna, \$50. Discount, 40 per cent.

## MARION CYCLE COMPANY,

MARION, IND., U. S. A.

The Largest and Most Complete Line of Bicycles made in America.

## Halladay AND Aetna Bicycles

Strictly of the Highest Grade.  
Absolutely Guaranteed.

Prices quoted with discounts are our BEST and cannot be beat for quality offered. Can refer to largest dealers in America. Complete line for reliable service. Orders accepted through reliable commission houses. Mail exact copy of order direct to us. Direct orders must be accompanied by Draft on New York or San Francisco. All goods carefully boxed for ocean shipment, F. O. B. New York; or delivered San Francisco or New Orleans, \$1.00 net extra per machine. Send for Art Catalogue mailed free.



26-inch Girls' Aetna, \$50. Discount, 40 per cent.



24-inch Girls' Aetna, \$40. Discount, 35 per cent.



24-inch Boys' Aetna, \$40. Discount, 35 per cent.





### How to Ruin a Bicycle Maker.

A LEADING cycle firm has this to say about the "option evil." Options in 1898 are of a necessity few. The reduction in prices has driven the makers to build and supply such parts as are standard and can be used on machines in constant demand. No cycle maker in the world can keep parts enough in stock to fill all the combinations of pedals, handle-bars, saddles, gears, etc. This is especially true of the great cycle builders. It would give us or any other cycle maker great pleasure to supply bicycles trimmed in old gold, pink grips or any other combination that an ingenious mind might think out. The maker wants to give the purchaser just what he wants, but circumstances prevent him. The cycle maker must to a great degree tell what he can supply.

The stress of circumstances which best illustrates our point, that options cannot be left to customers, is found in our own business. If our agents throughout the civilized world were to order one machine a day for only one month in the year we would have orders for 90,000 machines. If left to the will of our patrons, no two of these orders would read alike.

Options are a delay in output. A great cycle maker has 3,000 agents to supply. He must keep filling their orders and do it promptly. How can he do it? There is only one sure way, *i. e.*, study the demands of the trade, know what length crank is called for most, know the height of frames, know all details. After he has found the standard, let him say to the 3,000 patrons through his catalogue: "We can supply you machines with the following specifications: We would be pleased to make up your special orders after we have received them, but you will have to wait six months if we do." After the specifications have been fixed, thousands of dollars are spent, hundreds of men toil, and the whole organization begins to labor on the season's supply. In the height of the industry, a little band of patrons say, "Halt! We don't want what the other 2,900 patrons do. We must have our cycles so and so."

There is a halt in the machinery, it is reversed and for a time is diverted from its usual channels. The output of 300 machines a day runs down to 80. The 1,000 or 1,200 men are out of their pathway. This little batch of irregular orders has checked the construction of 5,000 machines going through the works. It has delayed the delivery of 1,000 machines ten days, and it has caused complaint from 2,900 patrons, whom the little batch of agents who wouldn't stick to specifications never heard of.

"We will guarantee to take 50 agents and ruin any cycle maker in the world if he fills the orders the way they are sent."

### Decadence of Wooden Handle Bars.

FOR some reason or other the wooden handle bar is apparently waning in popularity. It has not equaled the record of its near relation, the wood rim, by any manner of means. The latter came at once into popular favor, and within the short space of a couple of seasons had relegated the steel rim to the scrap heap in this country. But the wooden bar, although persistently boomed, has not affected the steel bar to any serious extent. It is true there are a considerable number used, but the proportion is not nearly so large as has been looked for by its exponents.

A year ago, when manufacturers were arranging for the supply of parts and fittings for the approaching season, the estimate for wooden bars was unusually large, one of the country's leading manufacturers going so far as to allot not less than 70 per cent. of his production to be fitted with wooden bars. Needless to say the actual number probably was not over 5 per cent.

And yet the wooden bar offers some distinct advantages over the steel one. Primarily, of course, its principal function was to relieve vibration. In this it is a distinct success. Rough and rutty roads, Belgian blocks, cobble-stones, and similar hindrances to easy riding may be covered with a sensible lessening of arm and wrist fatigue and with much greater comfort. It can almost be said that the difference between a wooden bar and a steel one is equal to that between a pneumatic and a solid tire, so far as riding comfort goes. In case of the sudden falls to which the average rider and his machine are subject the

advantages of wood are manifest. Where the steel bar would be badly bent or damaged, in nine cases out of ten, the wooden one—if made out of good stanch hickory, as should always be the case—would merely yield to the extent of its elastic limit, and spring back not a whit the worse except for a scratch or two.

But with all its advantages the wooden bar has fallen off in popular favor except with the novice; and, strangely enough, the very point urged in its favor—its elasticity—is the one which condemns it with the older riders, especially those belonging to the fast brigade, who will have none of it. Your scorcher—whether real or only assumed—and likewise the hill-climber, all want a rigid, unyielding bar. Any "give" or elasticity is fatal to those who, by reason of either speed or hill-climbing qualities, require a prompt response to any demand made upon their machines. This, and this alone, is responsible for its failure to oust the steel bar; and although it will probably continue to grow in favor as its desirable qualities become more generally appreciated—more especially by those sensible riders who value comfort above speed—it will never accomplish what the wood rim has done—kill the steel one.

### Chiming Bells on Bicycles.

A COUPLE of dozen young ladies and gentlemen of Galveston are responsible for a most unique idea in bicycling. Just who thought out the scheme is not known, for the credit is generally shared. The company is termed "The bike bell ringers," and it sprang into existence after the passage of the ordinance requiring wheelers to carry lamps and to ring bells at all street crossings. These riders have fitted their wheels with lamps of different hues and with bells of different tones. The idea is to comply strictly with the law, and at the same time to have a little theatrical effect. The object of the law being to have wheelmen give notice of their coming, that object will certainly be attained in the case of the "bike bell ringers," for their approach is made known by the ringing out of sweet music. They have been practicing on the shell road out near the country bridge, and thus far have given no exhibitions in town. A *News* man, who had occasion to go to the western part of the city, was fortunate enough to meet the "bike bell ringers" on dress parade. A far down the road came the silent steeds, with ever-changing lights. First a group of red lights headed the procession, then came a group of red, white and blue, then a group of green lights, flanked by red and blue. And so the wheels and lights were constantly changing, making beautiful effects. As the wheels grew nearer the chiming of the bells could be heard. First a few bars were played from "The Chimes of Normandy," then came "Annie Laurie," the "Tinkle, Tinkle, Bells," song from "Olivette," and as the riders passed on and were lost in the distance the notes of "Home, Sweet Home," were heard.

The idea is a pretty one, and if adopted by other wheelmen will be welcomed on the streets for the harmony of sounds they bring in lieu of harsh and indiscriminate clanging.—*Galveston News.*

### Curves of Cheap Saddles.

THAT the curves or outlines of its leather top in any way indicate or index the quality of a cycle saddle is, it is safe to say, known to but few of those whose business it is to buy goods of the sort.

In talking of saddles, Secretary Tewksbury, of the Hunt Manufacturing Company—and he is competent authority—first brought the idea to light.

"Few people are aware of the significance that really exists in the outline and curves of a saddle-top," he said. "On examination of the different models of the various makers, it will be found that the curves found on cheap, trashy saddles made by upstart concerns and sold for a price that will not pay the cost of good material, not to mention the labor required to produce a good saddle, are very slight. The reason for this is that to produce a graceful, shapely saddle-top with beautiful and frequent curves, the very best of leather stock is necessary. Cheap, poor quality leather cannot be pressed in a die possessing numerous curves without tearing the leather. On this account, makers of these cheap saddles are absolutely forced to adopt slight curves in their saddle-tops or they could not make use of their cheap leather stock, which alone enables them to offer goods at ridiculous figures."

**To Compute Chainless Gear.**—Following is the method given by bevel gear experts for computing the gear of that form of chainless: Multiply the diameter of the rear wheel by the number of teeth on the spur-wheel on the crank-shaft; divide by the number of teeth on the spur-wheel on the forward end of the connecting shaft; multiply by the number of teeth on the spur-wheel on the rear of the connecting shaft, and divide by the number of teeth on the spur-wheel on the rear hub. The result will be the gear.



### Department-Store Competition.

OUR readers may be interested in the following sensible discussion of the chances of the ordinary dealer against the big department stores, even though the latter are somewhat of an American institution :

When the ordinary dealer reads in the advertisements of the department stores that first-class bicycles are sold for \$16.95, and then turns to the lowest quotations he is able to obtain, they being several dollars higher than that figure, there really does not seem to be much encouragement in the situation ; at least not at first blush. It looks like a plain proposition. The department store is a large institution of great financial strength. They advertise to furnish a bicycle to the rider at several dollars less than the dealer can buy. How can he compete with these prices ? He writes to a factory that is said to be making the lowest-priced wheel in the country, and they tell him that \$20 is the best they can do. If he bought 1,000 and paid spot cash they would not make the price to him, a dealer, as low as the department store quotes to the consumer, on one wheel. And the bicycle he figures on is admittedly inferior, while the department store wheel is claimed to be first class. Either the department-store proprietor loses money on each sale or he buys a great deal lower than the dealer.

In seeking the explanation of this condition the first thing to be remembered is that the bicycles advertised at these prices are not of the first-class by any means. On the contrary, they are of the class whose name rhymes with "first" and begins with the letter "w." In all probability they are greatly inferior to the goods offered the dealer at a few dollars more. The dealer's trade is not solicited by the factories making these cheapest goods, for the reason that they sell their output to department stores. The price is set and the wheel is built to suit the price. Wherever a five cent piece can be saved in the cost the opportunity is embraced at the sacrifice of quality. The apparent object is to see for how little money a bicycle can be produced. The motto, "Not how cheap, but how good," is transposed to read, "Not how good, but how cheap." The goods have no warranty, and when once the wheel and money have changed owners the buyer has all the risk.

On the other hand the factories who are seeking the trade of the small dealers set out with the object in view to produce a good wheel at the lowest possible cost. Durability and not price is the standard. They put their names on their product and cover it by the usual guaranty. Neither the dealer nor his customer runs the risk of defects. With these facts properly presented, prospective buyers, the majority at least, will decide in favor of the dealer's wheel.

The country dealer may rest assured that he will have no trouble in selling bicycles at \$25. If he can buy a wheel with the maker's name attached at a figure that will afford a profit if sold at \$25 he may be reasonably sure of getting his share of the trade. The best sellers, in our opinion, will be a little higher in price, say about \$35 to \$40 retail, for at this price the wheel will be reliable in every sense of the word.—*Farm Implement News.*

### The Question of Sundries.

VERY few implement-vehicle-bicycle dealers carry a stock of bicycle sundries, and in previous years they were wise in not doing so. The earlier riders scorned the use of bells, lamps, etc., but since municipal authorities have compelled the use of these things the trade has grown enormously. And in cities and towns where such regulations are not in force it is not considered good form to be without them. Some buggy dealers do not handle harness, whips, lap robes, etc., but the majority do, because they are expected to. So also is a bicycle dealer expected to handle lamps, bells, toe clips, trousers guards, etc. One objection that has been raised is the tendency of bicycle buyers to demand these things free of charge. But the dealer must learn to be firm in refusing such demands.

It would be a great mistake to stock up on every novelty that comes out as an alleged necessity to the bicycle rider, but it is now just as great a mistake to fail to carry a fair stock of the few staple sundries that all cyclists buy.

### The Bicycle Vocabulary.

IF Gavin Dalziel, the worthy Scotchman, who by many is said to have built the first bicycle, about 1835, could listen to the wheel nomenclature of the present day, he would never for a moment suspect it to be in any way associated with the work of his own genius.

He wouldn't know a dished sprocket from a gooseneck saddle post, nor a rat-trap pedal from a bevel gear. The pedals of his machine were called stirrups, and the whole contrivance was known as the wooden horse. Dalziel

estimated the length of a ride by the stiffness of his muscles, and selected his riding costume without the aid of a tailor.

Whether, after a scorch at a five-mile-an-hour rate of speed, he hastily rubbed himself down with alcohol and cologne, history doesn't tell. At all events, if he could have half an hour's talk with a modern wheelman he would hear enough strange terms to bewilder him for the remainder of his life, be that long or brief.

The readiness of novices, male and female alike, to acquaint themselves with much of the mechanical construction of the bicycle, and their free use of its technicalities, almost force the conclusion that before long every man, woman and child will be a natural mechanic. This much, however, is certain, that the more knowledge wheelmen have of the principles and mechanism of their mounts, the higher must be the standard of bicycles in the future, and the more extensive and intricate will be the cycling vocabulary.

### Interchangeability Not Easy.

WHILE American ingenuity has accomplished wonders in making the much-vaunted "interchangeable" feature of cycle parts a reality instead of a boast, yet there is unquestionably a very great abuse of the word. In fact, none but those who have actually encountered and overcome the difficulties standing in the way of achieving this interchangeability can form any idea of what it really costs to obtain it, and it is astonishing how many concerns fall short of it. When it is remembered that it is by no means easy to turn out on one machine, with the same tool, in the hands of one man, half a dozen parts—be they cups, cones, bolts, nuts or what not—exactly alike, the truth of this will be understood.

The simplest way to test this is to take an adjustable wrench and fit it to two sides of a nut. Then take it off and apply it to two other sides of the same nut, and the chances are that it won't fit just as it did at first. If it does, if the sides of the nut are all alike, you may rest assured that there has been first-class work put on them. The trouble is that no matter whether the machine the part is made on is automatic or not, it is impossible to make the parts exactly alike. By the exercise of great care, especially in inspection, it is possible to reduce the variation until only an expert would detect it, but the variation will be in almost exact ratio to the time (expense) bestowed upon it.

If this is true of two parts, made one right after the other, how much greater is the danger when the second part is made a week, a month or a year after the first one ? Take the case of a cone that is to be screwed on an axle, and is ordered for a machine a year or two old. If the cone is absolutely perfect as to size of hole, thread and shape of ball-race, difficulty in screwing it on the axle may be experienced, simply because the latter is a trifle large, or the threads are too full. How much more chance of this if there should be a slight variation in both axle and cone. Yet it must fit properly ; if it is too tight, it may break while being forced on the axle ; or, if too loose, it will be impossible to adjust the bearing properly. Yet in spite of all this there are plenty of American firms who will supply parts for their machines and stake their reputations on their fitting properly without alteration.—*The Wheel.*

### Country Electric Roads in America.

TROLLEY roads have become essential to the farmers, orchardists, vineyard-ists, dairymen, etc., over large sections of the Northern States. They radiate from cities out into the country from twenty to fifty miles. Sidings are arranged at the most available crossroads, where one or more freight cars, as may be needed, are dropped, until loaded. Then a motor car, carrying passengers, picks up the freight and hauls it to market. These roads run a few miles one side of the steam lines, and they find a great deal of business that would not go to the steam lines. They also bring the country people within easier touch of the city life, as well as providing cheap and ready access to market for much that would not otherwise be marketable. Parties are made up to attend a lecture, an opera or to see a play in town. When a great preacher from the East preaches in the city the country folk find it easy to hear him, at trifling cost. Social and political homogeneity is cultivated by these means of quick and cheap transit.

The cause of broader culture must be helped. The people of the rural districts are bound to be much improved in their manners, and, on the other hand, the excursions from the city to the country give the city folk opportunity for more direct contact with their rural neighbors than is possible where steam lines are the sole dependence. Whether the trolley is to finally supersede steam, it has already become an important developer ; and in this capacity the industry is in its infancy.





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Write us in regard  
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are the most perfect possible to manufacture.

Write to us concerning our New 1898 Models, also our Models 30 & 31.

English, German and French Catalogues.



The Best, Easiest-Running and Highest-Grade Bicycles on Earth Are the '98

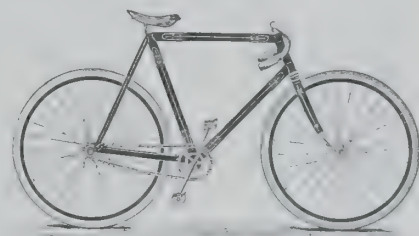
\$75.00

"SYLPHS."

\$75.00

They contain more up-to-date and practical improvements than any other machines, and are acknowledged to be, both at home and abroad, the finest machines made.

They are ESPECIALLY adapted for Export Trade. We are appointing agencies in many foreign countries, and we want to hear from reliable agents in all countries. Our "Sylphs," together with a full line of "OVERLAND" Cycles, are money catchers, and you will make a mistake if you fail to write us before you contract.



"OVERLAND" Cycles, all sizes, all patterns, \$40.00 to \$50.00.

ROUSE, HAZARD & CO., Manufacturers, Peoria, Ill., U. S. A.

# Hunt

## Saddles Are Famous the World Over

FOR THEIR SUPERIOR QUALITY, DURABILITY AND COMFORT.

European Agents: MARKT & CO., Ltd., Hamburg, London, Paris and New York.

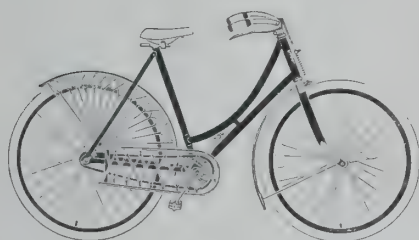
Send for catalogue showing many different patterns.



HUNT MFG. CO.,

WESTBORO, MASS.  
U. S. A.

The felt pads are supported on a laced framework of tough but elastic leather thongs.



## OUR WHEELS

are designed to suit the peculiar foreign climate.

THEY ARE STRONG, EASY RUNNING AND ELEGANT.

STEEL RIMS, FRONT AND REAR MUD GUARDS AND BRAKES OPTIONAL.

List,

\$60.00.

Discount,

50 per cent.

Write for special cash discount and catalogues direct or through reliable commission house, with copy of order to us.

LEAGUE CYCLE MFG. CO.,

Milwaukee, Wis., U. S. A.

# IMPERIAL Bicycle Lanterns

ARE FAVORITES THE WORLD OVER.

## WHY?

They will neither blow out nor jar out.

They are strong, safe, clean, attractive.

They produce a large, bright light. Are fitted with fine magnifying lense.

They are made from the very best material and possess positive merit.

MANY NEW FEATURES.

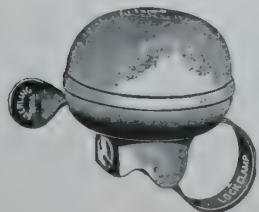
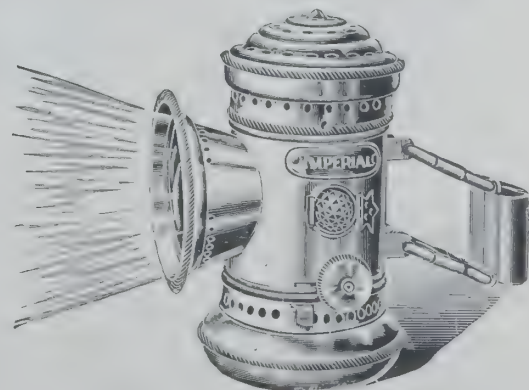
PRICES INTERESTING.

SEND FOR '98 CATALOGUE.

Manufactured by

THE E. P. BRECKENRIDGE CO.,

Toledo, Ohio, U. S. A.



## Sterling Bicycle Bells

ARE THE BEST IN THE WORLD.

Made in all sizes and styles. (32 numbers.) Send for Catalogue "B."

N. N. HILL BRASS COMPANY,  
EAST HAMPTON, CONN., U. S. A.



## No More Rust.

Our "Three in One" Lubricant Contains no Acid.

Prevents Rust on All Metals.

The only perfect Lubricant for Bicycles, Guns, Sewing Machines, Reels, Etc. Never gums or hardens. For cleaning Bicycles or Fire Arms after shooting. It has no equal. It is transparent and clean to use. Correspondence solicited. Send for Catalogue "C." Order through Export Commission Houses in this country. Manufactured by

G. W. COLE & CO., 111 B'way, New York, U. S. A.



### Marked Advance in Saddle-Making.

MANY and varied as are the new saddles shown for 1898, there is one type which is conspicuous by its prevalence in all the leading lines. This is the so-called "hygienic," or padded saddle, in which two elevated and separated pads carry the rider's weight supposedly upon the ischial parts, the idea being to relieve that bugbear of all riders—perineal pressure.

That some of these saddles do accomplish their purpose is conceded; others do not; but, even on a majority of those which were properly designed from the physical standpoint, the comfort of the rider has hitherto been but little considered. The pads have been, in many instances, too hard, or been stuffed with a cheap material that, when compressed, did not return to the original shape; others, while having proper filling, were not durably constructed; and in very few were the pads so shaped as to give an easy seat under long-continued riding, the corners being too abrupt and not properly rounded.

For 1898 all this has been changed—in the best makes. Not only are the angles smoothed out, and the corners rounded off the pads, but the shape of the saddle itself has been changed to correspond more nearly to that which past experience has proven to be the best for long-distance riding. The well known Brown shape has been adopted for use with the pads; and the scorcher, as well as the sedate and elderly rider, can find comfort combined with speed in their use.

Without a pommel, it has been heretofore somewhat difficult to maintain an easy seat on some of the saddles, but this is now remedied, and the result is that not only does the rider secure the benefits of hygienic construction, but, in addition, he possesses a feeling of security which is induced by the longer pommel. There is no question but that this gives a greater control of the wheel when riding either with or without hands upon the handle bars, and, as a natural sequence, affords also much more comfort.

One of the faults of some of the 1897 padded saddles was the sewing of the pads directly upon the leather top. In ninety-nine cases out of a hundred the stretch or sag of the leather invariably affected the pads to such an extent that they speedily became very uncomfortable. On the new 1898 goods the leather tops are first stretched upon a firm base, thus preventing this very serious fault.

Numerous are the styles in which the 1898 goods are made up. Not only do the styles and shapes of saddles themselves show a great variety, but colored leathers of all kinds have been pressed into service. Many expensive saddles are upholstered (if the term may be allowed) in alligators, Russia, seal and other expensive leathers. Maroons, russets, blacks and even dark greens vie with the natural colors in the popular demand. It is very evident that more than ever are the makers of high-grade machines willing to cater to ideas of luxuriousness in saddle and other fittings.

### Question of Price.

RETAIL bicycle values will appeal more strongly to the buyer in 1898 than ever before. A critical examination of the new models thus far shown strongly emphasizes this fact. While no radical changes—apart from the chainless—are in evidence, the machines exhibited to date embody a perfection of finish, equipment and detail that testify as no language could do to the vigilance and progressiveness of the manufacturer.

No such value has ever been placed upon the market. No such value could have come anywhere near being furnished heretofore. It has been rendered possible only by the shrinkage in the cost of materials, no less than by an improvement in methods to which the closest attention has been compelled by shrewd makers who have had to face the changed conditions. In the cost of raw materials alone, so marked has been the reduction in prices, that it is estimated that from 10 to 20 per cent., and even more, is the scaling down from figures paid for the past season's goods.

But while the retail buyer of next Spring and Summer will receive more for his money than could have been believed possible a year ago, more than ever will it be necessary that a nice discrimination be exercised by both agent and rider, as in the effort to meet the demand for machines at lower prices not only have processes been materially cheapened, but in addition, materials, the cost of which is so far below the market price of reliable stock that of necessity they must be of the poorest quality, are being produced in no small quantities. There are tires, stampings, fittings and equipments generally composed of materials of this class—materials the only recommendation of which is their cheapness, as far as price is concerned.

Despite the numerous breakdowns and collapses of the cheap department-store and auction-room bicycle of the past two seasons, it is quite evident that

the public has not yet learned its lesson. There will be in 1898, as in the past, thousands upon thousands of good, honestly made bicycles at moderate prices. Why, then, should the buyer risk his reputation if an agent, or his neck if a rider, by the purchase of bicycles whose construction and price is their own condemnation?

The retail buyer can, perhaps, plead the excuse of ignorance, up to a certain point, but the agent or dealer can offer no such plea. He owes it to the public, if not to his own sense of duty, to stand between the unscrupulous maker, whose wheels are thrown together in some shed, and the rider. Seduced by the siren cry of cheapness, the public flock to the auction room and the unscrupulous or ignorant department store.

Therefore, let the bicycle agent provide himself with a sample of the cheaper wheels, to be sold if need be, but to be used mainly as an "object lesson," and in the majority of instances it will be found that if the difference in values be carefully explained to the prospective customer he will decide in favor of a better-grade machine. At least, he will not have the excuse of ignorance.

The importance of this subject cannot be too strongly impressed upon the trade. The legitimate manufacturer and dealer has suffered enough in the past from disreputable competition. Imbued with a firm, if mistaken, belief that bicycle prices were too high, the purchase of high-grade wheels—except at cut rates—has fallen off incredibly. But with the standard price of this class of machines fixed at from \$75 to \$50 for 1898, there should come a revival of the demand, which should inure to the benefit of the best made bicycles under well-known name-plates.—*The Wheel.*

### Big Increase in American Bicycle Exports.

IN spite of the inborn prejudice of the average Englishman against the product of nations other than his own the bicycle trade of American manufacturers in Great Britain has grown with tremendous strides during the past two years. From tables compiled by the Government it is shown that our increase in this particular branch has been greater than in any other department of our export commerce. The exports of bicycles from American ports to Great Britain during the fiscal year ending May 31, 1896, amounted in value to \$321,000. The value of bicycle exports for the corresponding year ending May 31, 1897, reached the surprising figure of \$2,082,000. The meaning of that jump of almost 700 per cent. in one year is unmistakable, particularly when it is taken into consideration that only high-grade machines can be marketed successfully in England. The chief reason for this remarkable development is the fact that American manufacturers have greatly lessened the cost of and largely increased their output by the employment of automatic machinery, while with very few exceptions the British makers stick to the old methods of hand-labor. Certain bicycle parts are being turned out by American factories by the thousand, while the British are content with single pieces made laboriously and expensively by hand. The machine-made product of the Americans has the added advantage in that duplicates of each piece must needs be exactly alike and hence all parts are interchangeable.

**American Bicycles in Austria.**—Regardless of the high tariff a large number of American bicycles have been sold in Austria. The people recognize the superiority of the workmanship and material and consequently buy them whenever possible. One dealer alone has sold 700 of one make during the last year and a half. Parts, such as saddles, pedals, handle-bars of wood, wood rims, etc., are sold in considerable quantities. In fact, every high-grade wheel seems to be equipped with an American saddle of hygienic pattern and American pedals.

**February Bicycle Shipments.**—Encouraging results are being obtained by several of the large bicycle manufacturers in obtaining European trade this year. A recent European mail brought orders to two prominent wheel makers aggregating a total of 4,000 bicycles between them. One of these concerns claims that its share was exactly 3,000 wheels, to be sent at different times to London during February and March. The markets which are naturally looked to for a large consumption of bicycles this year are Germany and England. It is claimed by several of the large wheel shippers that during the month of February upwards of 10,000 bicycles were sent to Europe.

**Trolley Freight Service.**—The latest extension of the trolley freight service is for the shipment of cattle, a case being reported from Mason City and Clear Lake Electric Railroad. The road is 17 miles long and passes within a short distance of many of the best farms in Iowa. At Mason City the stock is transferred to regular trains for the Eastern markets. This line will soon be extended to take in other farming districts.



# BICYCLES!

## "ILLINOIS" Bicycles.

Best bargains offered in Bicycles for 1898.

Spiral Screw Drivers.

Reversible Bit Screw Drivers.

One Hole Hand Corn Shellers.

Waffle Irons.

Serrated Edge Knives.

WE ARE THE WORLD'S HEADQUARTERS  
FOR THESE GOODS.

Paring Knives.

Mincing Knives.

Meat Tenderers.

Can Openers and Hardware Specialties.

SEND TO ANY EXPORTER IN THE UNITED STATES, OR TO US  
DIRECT FOR OUR 1898 ILLUSTRATED EXPORT  
SPECIAL, GIVING NET PRICES.

## ILLINOIS CUTLERY COMPANY,

Decatur, Ill., U. S. A.



### '97 Model Now Ready.

Patee bicycles have a world-wide reputation because they are always "up to date" in every particular, and also because only the very best material is used in their construction.



They are built by the oldest and best-known high-grade bicycle men in America, and the '97 model embodies some new and special features that will fascinate wheelmen and dealers instantly.

The one-piece crank shaft and cranks, the thorough dust-proof device, the quality of tool steel in bearings, the manner of re-enforcing, the adjustable bar and manner of locking in the head are all new and special features used exclusively on the "Patee" (our own patents).

Do not contract for '97 without getting our catalogue and prices and seeing sample. It is unblushingly and emphatically the best bicycle in the world for the money, and is guaranteed equal to any bicycle in the world. American list, \$60.00. Liberal discount to dealers. Do not be afraid to write. We want your business and will take pleasure in telling you more about our wheel. Address

**PEORIA RUBBER & MFG. CO.,**  
PEORIA, ILL., U. S. A.

MADE BY  
THE  
Peoria Rubber and Manufacturing Co.

## NIAGARA

**SHREWD BUYERS**

Are successful business men, consequently well-informed dealers are anxious to secure agencies for

### Niagara Bicycles.

Well-made wheels give riders satisfaction and dealers profit, which fact accounts for the well-known motto:  
"Once a Niagara Agent Always a Niagara Agent."

Address Dept. H.,  
**BUFFALO WHEEL COMPANY,**  
BUFFALO, N. Y., U. S. A.

Agencies arranged in unoccupied territory. Write at once for our '98 Catalogue fully describing new models.

## RALPH TEMPLE CYCLE CO.,

204 35TH STREET, CHICAGO, U. S. A.

Best and Lowest Priced Bicycles in America.

Catalogue in English, German and Spanish.  
We export to nearly every country in the world.  
Our machines are complete with good, serviceable  
Breaks and Guards.

WE FIT ANY TIRE YOU ASK FOR.



Export price this machine only \$25.00.

*Temple*

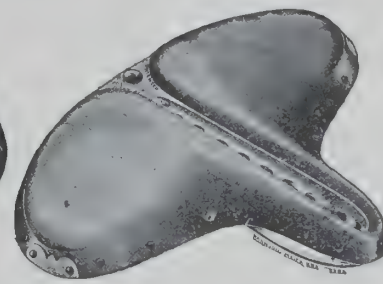
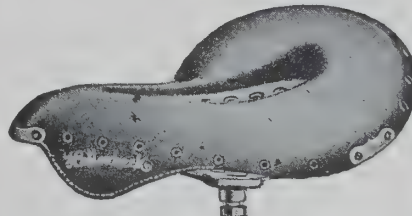
Our prices include goods, properly packed, f. o. b. steamship at New York. Catalogue, prices and terms cheerfully given. If you want to save delay you can send us a sample order which we will ship cash against B-L at our export prices. Order the price machine you want, or a sample of each. We make bicycles that sell for \$40, \$50, \$60, \$75.

We can convince you we are the people to do business with. Repair parts sent with each order without charge. As to the reliability of our machines we will gladly give first-class references from those who sell our goods in many parts of the world.

**HOLLENBECK SADDLE CO.,** Successors to F. A. Hollenbeck & Co., Syracuse, N. Y., U. S. A.

Manufacturers and Exporters of

### BICYCLE SADDLES.



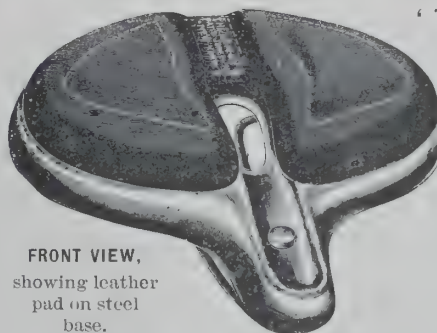
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Catalogue 8 on application.

Correspondence solicited.

### LENOX ANATOMICAL SADDLE.

"T'S BUILT TO FIT."



FRONT VIEW,  
showing leather  
pad on steel  
base.

Two  
sizes:

Model C,  
8½  
inches;

Model D,  
10  
inches.



BOTTOM VIEW,  
showing steel base, coil  
spring and reinforce-  
ments.

### LENOX Specialties

are famous the world over for quality,  
durability and price.

**SUNDRIES** manufactured by us  
are GUARANTEED.

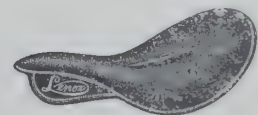
Manufacturers, Jobbers and Dealers  
will be interested in our prices. Send  
for them. Correspondence solicited.

**The LENOX MFG. Co.**

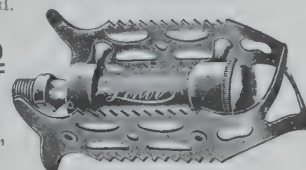
197, 199 and 201 Grand Street,  
New York, U. S. A.

Cable Address: "Lenox, New York."

Lenox Automatic Bicycle Bell.



Lenox Racing Saddle.





### New Catalogues and Trade Publications.

*These catalogues may be had free of charge on application to the firms issuing them. Please mention THE AMERICAN EXPORTER when you write.*

THE KEYSER MANUFACTURING COMPANY, Chattanooga, Tenn., U. S. A.: Illustrated catalogue and price list of their "Odorless" refrigerators, containing numerous testimonials and a good deal of useful refrigerator information.

THE JEFFREY MANUFACTURING COMPANY, Columbus, Ohio, U. S. A.: Special saw-mill circular and price list showing an extensive line of chain and steel cable conveyors for the handling of logs, lumber, refuse, slabs, offal, shavings, sawdust, etc. This list represents only a portion of the specialties manufactured by the Jeffrey Company. Illustrated.

ST. LOUIS ALUMINUM CASTING COMPANY, 802 South Seventh street, St. Louis, Mo., U. S. A., have sent us an illustrated catalogue of their 1898 aluminum bicycle "New Lu-mi-num." The catalogue lays special stress upon the advantages of aluminum as a material for bicycle construction, and upon the gear case (cast with the frame) and hubs, which are notable features of this machine. Illustrated descriptions are given of all parts and extras, together with specifications of the five models supplied to the trade by this firm.

THE WATEROUS ENGINE WORKS COMPANY, Limited, Brantford, Canada: 1898 catalogue of wood-working machinery. This is a very elaborate volume, giving descriptions and illustrations of numerous types of surface planers, hand planers, jointers, machines for planing and matching, molding, shaping, panelling, dovetailing, tenoning, mortising and blind work, boring, band and scroll sawing, sandpapering, etc.—in short a very complete list of wood working machinery. The value of the 161 pages of this catalogue is enhanced by an index and it contains a telegraph code.

OHIO ELECTRIC WORKS, Cleveland, Ohio, U. S. A.: An illustrated list of a great variety of electric novelties manufactured by this firm, including electric bicycle or carriage lamps, electric student lamps, various electro-medical outfits, electric door bells, automatic telephone annunciators, small motors, fans, etc., and numerous other electrical contrivances for home or office use.

GOLD MEDAL CAMP FURNITURE AND NOVELTY MANUFACTURING COMPANY, Racine, Wis., U. S. A.: A handbook of folding camp-beds and house cots, camp and lawn chairs, folding stools, chairs and tables, reclining chairs, lawn settees, and similar articles. A folding bath-tub is one of the novelties described. Illustrated.

THE E. HOWARD WATCH AND CLOCK COMPANY, 383 Washington street, Boston, Mass., U. S. A.: The 1898 cycle catalogue of this firm devotes particular attention to the finer points in bicycle mechanism, in which, as might be expected of a firm also engaged in the manufacture of watches, this house is especially interested. There are detailed descriptions of the "Howard Roadster," the tandems and other models offered. The catalogues sent us are printed in English, French and German.

C. A. WOOLSEY PAINT AND COLOR COMPANY, 100 and 102 Hudson street, Jersey City, N. J., U. S. A.: Price list of paints, coach and car colors, distemper, fresco or water colors, stains, varnishes, roof cement, bicycle enamel, kalsomine, iron and marine paints, etc. With fac-simile illustrations of labels in original colors.

### A Rapid Bridge Renewal

A REMARKABLE record for rapid bridge renewal was made by the engineers of the Pennsylvania Railroad Company recently, when a large iron structure on the busiest part of that road was taken away and a new span put in its place in the remarkable time of nine minutes. This feat was performed on the bridge which crosses the Schuylkill River, carrying the tracks of the New York branch over that beautiful stream just above Girard avenue, Philadelphia. The approaches of this structure are of the most substantial stone work, and a long metal span stretches across the river, connecting the arches on either side. The original span was placed in 1868, and as lately it has not been considered strong enough to sustain the weight of the heavy traffic which is now sent over this line, it was decided to renew it. With this end in view a new span was built on a construction of false work which had been raised on the south side of the bridge. Another false work was also built to the north side. In the river, also to the north, two floats, with a dummy engine on each, were anchored, and two other auxiliary engines were placed on the false work at either end of the span. Sunday afternoon was fixed as the most available time to make the exchange of spans, as the business is much lighter on that day. The Chestnut Hill train due at this point at 2:17 was not yet off the bridge when the work of dismantling was commenced at the other end. The track

connections were quickly cut, and at a signal both the new and the old spans were raised simultaneously by hydraulic pressure. Another signal was then given for the engines to pull. In exactly two minutes and twenty-eight seconds the change was made and the new iron work slipped into its permanent resting place. It was only the task of a few minutes more to complete the track connection again, and in exactly nine minutes after the passage of the Chestnut Hill train, the special car of Superintendent Brooks went smoothly over the bridge without a hitch. Then a couple of heavily ballasted freight trains were rolled back and forth over the bridge tracks as a test, and, having withstood this trial, the structure was declared ready for regular work.

The new span, which is constructed entirely of steel, is 240 feet long, 25 feet wide and 30 feet high. It is known as a Pratt truss or a single intersection quadrangular type of bridge. The old span was of the Linnville or double intersection type, and with its castings weighed 750 tons, while the new span is 200 tons heavier. The two were fastened together and moved at the same time, so that the entire load was 1,700 tons. The new span was built by the Edgemoor Iron Company, but the work of putting it into place was performed wholly by the men of the Pennsylvania Company.

The plans for accomplishing this great work were devised by Joseph T. Richards, the engineer of maintenance of way of the railroad company. Several weeks were consumed in the making of these preparations, as the greatest care had to be exercised and every possibility figured out to a nicety. A single mistake meant disaster and possibly serious interruption to the road's business. To avert any such trouble as this, each workman was given a particular duty to perform, and the success of the work attests the excellence with which the orders given were carried out. Bridges have been moved before by the same methods, but heretofore the change has occurred on very small structures on less frequented parts of the road. Never before has so massive a bridge been removed in so short a time.

### Electricity for Drilling.

ELECTRICITY as a motive power was recently called into play in drilling thousands of holes through the webs of the rails of the South Side Elevated Railroad in Chicago while the motive power was being changed from steam to electricity. One hole—seven-eighths of an inch in diameter—was needed in each end of every rail, and altogether there were 20,000 holes to be drilled. The work had to be done while the road was in operation, and the space for operating drills was only the 9 inches between the wheel rail and the heavy wooden guard rail. The work would ordinarily be done with ratchet drill stocks operated by hand, but with these progress would have been very slow. Instead of this, electric motors were called into use. Each motor was mounted in a little car, which ran upon the wooden guard rails and drove a flexible shaft 10 or 12 feet in length, which in turn ran the drill. The drill for each machine was mounted in a compact frame, with a screw at the upper end, and the whole thing—drill, frame and screw—was just of a size to fit in between the metal rail and the outer wooden guard rail. In some places where there were convenient cross-overs in the tracks the motor wagons could be kept in place on the guard rails, and drilling could be done continuously, but at other places the work had to be done between trains, and these often ran under two minutes' headway. The outfits proved to be so handy for the purpose and the men working them became so expert that during the entire progress of the work not a train was delayed for more than ten seconds by the drillers.

### German Exports to the United States.

UNDER date of December 24, 1897, Consul-General Goldschmidt transmitted from Berlin tables showing the exports from Germany to the United States during the fiscal years 1895-96 and 1896-97. The total for the year ending June 30, 1896 (fiscal year 1895-96), was \$90,642,773, and the total for the year ending June 30, 1897 (fiscal year 1896-97), was \$111,862,552, showing a net increase of \$21,219,779.

Under date of January 29, 1898, the Consul General writes:

In view of the fact that still a great deal of ink is wasted by the press of this country in talking and preaching retaliation and stirring up ill feeling towards the United States I have again undertaken to compile a comparative statement of the exports from Germany during the calendar years 1896 and 1897. [From the consuls' tables, which we cannot find space to print here in full, it appears that the exports from Germany to the United States for the calendar year 1897 were \$97,347,198.26 as against \$92,424,641.87 for 1896, a gain of \$4,922,556.39.

The exports of sugar for the calendar year 1897 were \$20,421,491.11 as against \$19,665,369.10 for 1896—an increase of \$756,665.01.]



**"THE FINEST ON EARTH."** — That's a broad claim to make for anything, but in the case of the

# MANSON 3 CROWN, Model 33,

IT'S BUT THE SIMPLE TRUTH, AND THERE IS NO NEED TO DEVIATE FROM THE TRUTH.

## THE SEVERAL REASONS WHY?

It is made of the very best material. It is new and novel and eminently practical.

It has two rear crowns to match the front fork crown, causing the machine to be absolutely rigid.

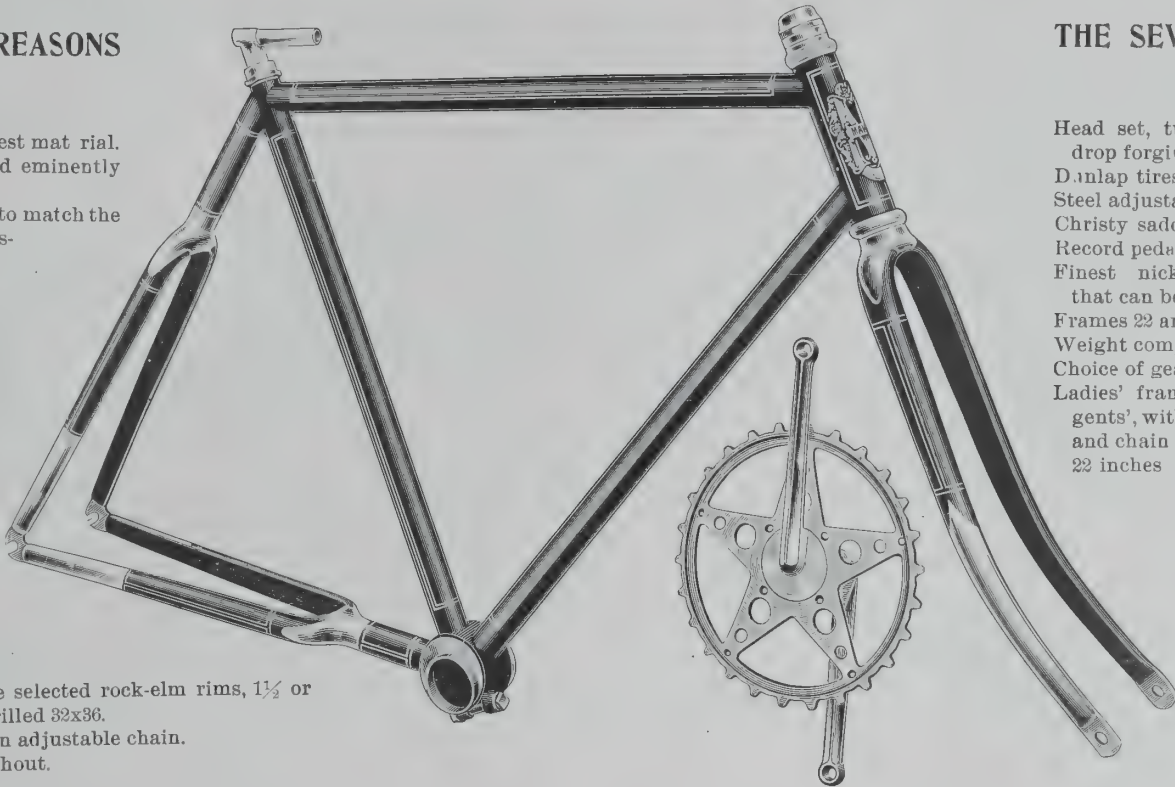
It has an eccentric bracket at the hanger which facilitates the adjustment of the chain without using the rear chain adjusters, and is fitted with the one-piece Fauber crank.

The Thor Hubs are used and recognized everywhere to be the best.

The best swaged spokes, 14x16 size, are used.

Laminated, or one-piece selected rock-elm rims, 1½ or 1¾, 28-inch wheels, drilled 32x36.

The Peacock or Baldwin adjustable chain. Seamless tubing throughout.



## THE SEVERAL REASONS WHY?

Head set, turned from bar steel, drop forging connections.

Dunlap tires.

Steel adjustable handle bars.

Christy saddles.

Record pedals.

Finest nickeling and enameling that can be put on a bicycle.

Frames 22 and 24 inches high.

Weight complete, 24 pounds.

Choice of gear.

Ladies' frames are made same as gents', with exceptions of drop bar and chain guards. Height, 20 and 22 inches

\*\*\*\*\*

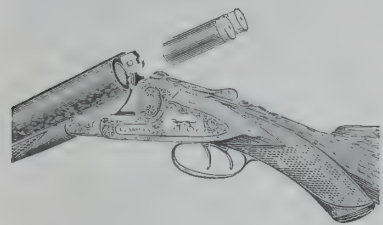
THE PRICES:

**\$75.00**

less 33¼ and 5 per cent., delivered f. o. b. New York.

**MANSON CYCLE CO.,** 153-155 West Jackson St., Chicago, Ill., U. S. A.  
Cable Address: "MANSON."

## L. C. SMITH GUNS. ALL BORED FOR NITRO POWDER.



Guaranteed never to shoot loose.

8, 10, 12 and 16 Gauges.

We use Whitworth Fluid Steel, Crown Steel and Damascus Barrels.

Send for Catalogue.

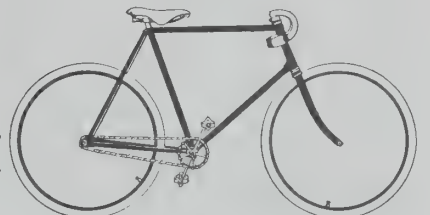
We now put Ejector Mechanism on all our different grades.

## We also manufacture "HUNTER" BICYCLES the CELEBRATED

which are unsurpassed for

**Beauty, Strength, Durability and Easy Running Qualities.**

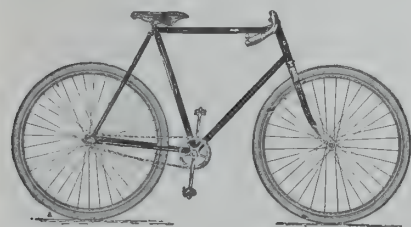
These Bicycles embody all the latest improvements. Send for catalogue.



Fulton, N.Y., U. S. A.

**THE HUNTER ARMS CO.**

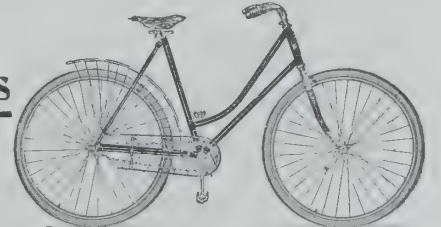
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**Soudan**  
Nile and Pyramid  
Bicycles and Tandems  
High-Class Bicycles for Export.  
We want Agents in every country.

WRITE FOR SPECIAL ILLUSTRATIONS AND QUOTATIONS.

**Nile and Pyramid Bicycles and Tandems**



**THE SOUDAN MANUFACTURING COMPANY,** Successors to MASON & MASON CO.,

CABLE ADDRESS: "SOUDAN, CHICAGO."

CHICAGO, ILLS., U. S. A.

## BICYCLE HANDLE BARS.

Best Nickeled over Heavy Copper. Made 7-8 Tube Tops.

PRICES, WITHOUT GRIPS, F. O. B. NEWYORK.

Upturned, one doz. lots .....\$10.50

Drop, one doz. lots ..... 10.50

Octagon Tube, extra, per doz. .... 3.00

"Schinnec" Bars, extra, per doz. .... 1.20

One-inch Tube, extra, per doz. .... 1.20

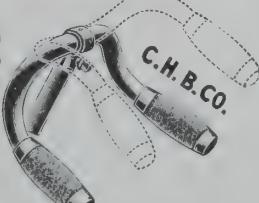
Ram's Horn, one doz. lots ..... 11.50

Adjustable, one doz. lots ..... 13.50

Anti-Vibration, extra, per doz. .... 3.00

Seat Posts, per doz. .... 3.60

Any size stems. Discount to the trade on 100 to 50,000 lots.



**Chicago Handle-Bar Co.,** 34 & 36 Market St., Chicago, Ill., U. S. A.

**— KNOCKED OUT —**  
**COMPETITION KILLED**  
**• BY OUR PRICES •**  
**GREATEST LINE OF BICYCLES ON EARTH**  
**THE AMERICAN BEAUTIES**

**10—MODELS—10**  
**WINDSORS, NORTHFIELDS, WINFIELDS.**

Catalogues for nothing. Write for our confidential offer, which will surprise you.

In sending orders through export commission houses send us duplicate order.

**The BROWN-LEWIS CYCLE CO.,** 300 Wabash Ave., Chicago, Ill., U.S.A.





*Devoted to the Foreign Trade in Electrical Appliances.*

### The Third-Rail Electric System.

THE third-rail electric system, which has recently had a successful test on a road in New England, is likely now to be introduced on an elevated railway in New York City. By the use of the third rail all poles and overhead wires are done away with. This will abolish the trolley system, the electric current being conveyed on an extra rail. On the New England road these rails are ninety-three pounds in weight. They are laid upon blocks of wood, which are creosoted and bonded together by plates of sheet copper. The motor car is connected with the current rail, which is placed near the centre of the track by cast-iron sliding shoes, each of which is 12 inches long and 4 inches wide, and suspended by two links from a casting placed beneath each truck. Flexible cables allow for the deviation of the cars in going around curves and in working on the springs. At road crossings and in other places where it is necessary to remove the rail the current is conducted by copper cables, and the shoe is so arranged that it can be lifted above the rail without danger of catching or breaking. By this system a speed of fifty or sixty miles an hour has been attained.

The third rail system passed through a recent blizzard without a hitch and with flying colors. The snowfall was so heavy as to completely stall trains on many of the steam railroads throughout New England, yet the trains running on the electric system maintained their schedule time throughout the day. It was an opportunity for a severe test, which all advocates of electric traction for short steam roads have been awaiting with interest, and it is a matter for congratulation that the test was so successfully met.

### Changeable Electric Letters.

THE changeable "Crandall" letters used by some of the New York journals for bulletins in the recent election are thus described in *The Electrical World*:

"The letters consist of an arrangement of fifty-one lamps, so arranged that by lighting different combinations of the lamps the various letters of the alphabet can be formed. The lights are fed in nineteen groups over a nineteen-wire cable, connecting them to nineteen cross bars on a keyboard. The depression of any one key of the keyboard closes the proper groups for the representation in light of the letter corresponding to that key. The keyboard is ingeniously fitted with an electromagnet so arranged that when any one key is depressed it is held down until the magnet circuit is opened. The words are first set by the depression of the proper keys on the various keyboards, one for each letter, after which the main switch is closed. Arcing at the keyboard contacts is prevented by opening the main switch before the auxiliary switch controlling the magnets is opened. In the sign erected on Madison Square there were thirty-six letters and six figures, each letter and figure being approximately 3x4 feet in size. The whole sign was some 78 feet long by 35 feet in height. The returns were more readily announced by this sign than by any other means heretofore devised, the letters being legible at a distance of over half a mile."

### The Largest Generator.

THE largest generator for electric traction work ever built is now being constructed in this country. When finished it will be installed at the Logan Street station of the Louisville Railway Company, Louisville, Ky. On account of its large diameter the armature of this generator cannot be transported over the railroads in its completed state, either erect or on its side. The generator will therefore be assembled in Louisville. The completed machine will have twenty-two poles, an output of 2,400 kilowatts, or 3,000 horse power, and will be driven at a speed of 75 revolutions per minute by a 4,000 horse-power cross-compound engine.

The generator will be constructed to stand an overload of about one-third, so that the capacity in case of emergencies may equal 3,206 kilowatts, or over 4,000 horse-power. The principal dimensions of the machine will be as follows: Diameter of field frame, 10 feet; width of field frame, 4 feet 1 inch; diameter of armature, 12 feet 9 inches; diameter of commutator, 9 feet 8 inches; diameter

of shaft, 2 feet 8 inches; total weight of armature and commutator, 83,000 pounds; width of armature, 5 feet; width of commutator, 21 inches; total width of generator, 77 inches; total weight of generator complete, 174,000 pounds.

Previous to the manufacture of this machine the largest generators constructed for electric railway work were those of 1,600 kilowatts, or about 2,500 horse-power, the first of which was used in the Intramural power house at the World's Fair.

Dynamos of the same enormous output have since been installed in Philadelphia, Boston and Chicago. Four are also operating in the Kent Avenue power-station of the Brooklyn City Railroad and two of similar size are now being added. At present this power-house contains the largest single exhibit of moving machinery in Greater New York. In no other city of the state, with the exception of Niagara Falls, can 10,000 horse-power in engines and dynamos be seen in almost constant daily operation.

### Silent Electric Cars.

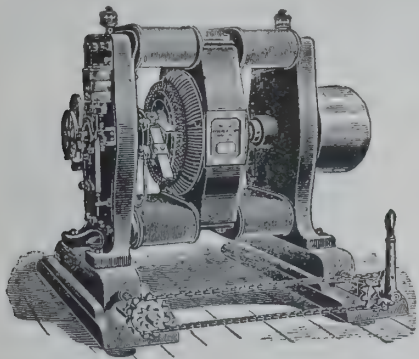
ONE of the most formidable factors with which the noise-nuisance crusaders of some large cities have to grapple is the varied graded din of the railroads. It is not generally known that some years ago the company owning the elevated roads of New York employed Mr. Edison to investigate, with a view to its mitigation, the question of the roar and rattle of the trains. Many singular features were brought out, such as the drum sound given forth by the vibration of the panels of the ordinary car, and the various kinds of sounds produced by the trucks, the wheels, the tracks and the elevated structure itself, and Mr. Edison suggested a number of remedies. But nothing came of it all, and the noise continues, with possibly a slight annual increment of harshness, to this day. That the noise of trains can be materially lessened is, however, certain, and a most significant step has just been taken in this country in the construction of a "silent trolley car." In this car all the old sources of rattle and rumble have been eliminated, and the vehicle moves along with a quietness that is so unwonted as to be almost startling. The "booming" of the panels is killed by layers of metal wood, which cut off any concussion which might find its way from the wheels and trucks. One of the essential differences between the new and the old construction is the employment of wooden instead of iron trucks; another is the substitution of rubber cylinders for heavy iron springs. There is also a new form of brake which, instead of jarring every bone in one's body, stops the car silently and smoothly. Every point in the general purpose of the construction is well worked out, and the car is actually what its name implies, noiseless.

### An Improved Wire for Electrical Use.

MUCH has been done to mitigate the dangers of accidental fires by the introduction of various electrical devices into the interior of buildings. The latest of these is radical in character, but admirably simple and effective in action. It is practically a wire which gives its own alarm of fire or burglary as soon as it is interfered with, either by abnormal heat or the cutting tool of the burglar. The wire is a solid copper conductor, coated with a metal which fuses at the low temperature of 374 degrees. This metal, in turn, is overlaid with proper insulating material. On the outer side of the insulation, a second, third and fourth conductor are so placed as to be insulated from each other by similar insulating material. The whole is then protected by a heavy outer covering of insulation, which, while ornamental, water proof or damp proof, is sufficiently strong to withstand considerable mechanical injury. Should any part of the conductor be subjected to the flame of an ordinary match or dangerous heat, the alarm will be immediately sounded, the precise location of the fire being simultaneously announced on an indicator, or on several indicators in different parts of the building.

The problem solved in this invention is the making of all electric wires employed in every interior electrical installation, and for whatever purpose, capable of discovering incipient fire from every point of its length and giving warning thereof, locally or centrally. In other words, every inch of the conductor becomes a sensitive thermostat and an automatic notifying station; it serves as an omnipresent watchman, always alert and prompt in action, for no excessive heat can exist in its vicinity for more than a few seconds without sending in an alarm. If a burglar should tamper with the window or door alarms, or other safety devices, as he cuts the wire, the disturbance is recorded on the dial. The wire can be run within the cornice, above the shelves, or in any direction. In coal bunkers, or the hold of a ship, where it is intended for giving warning of spontaneous combustion, the conductor is laid in pipes, which protect it from rough usage, but leave it subject to the action of heat.





# FORT WAYNE ELECTRIC CORPORATION,

Foreign Dept.: 115 Broadway, New York, U. S. A.

Factory: Fort Wayne, Ind., U. S. A.

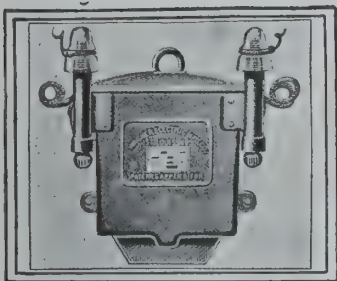
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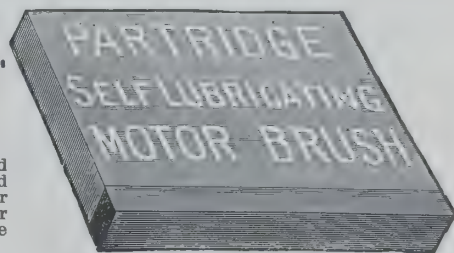
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Write direct to factory for catalogue, price list and other information.

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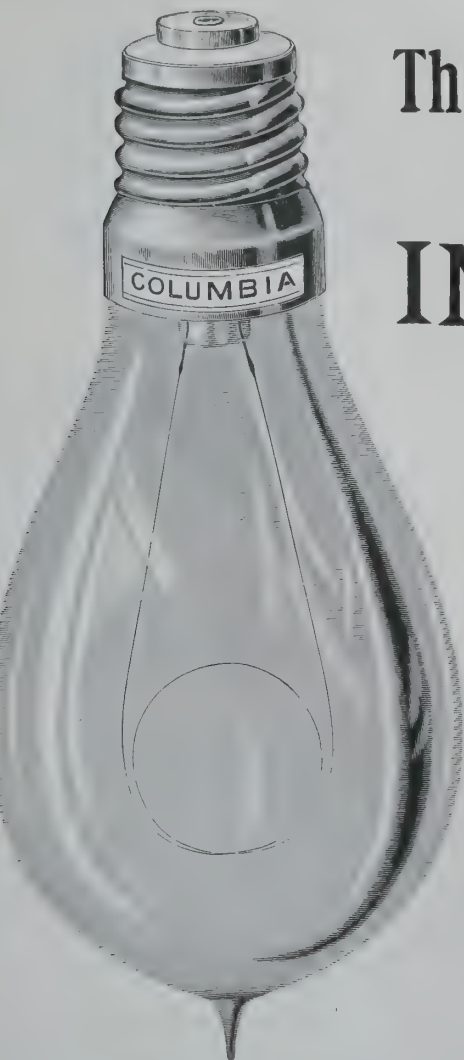
THE COLUMBIA INCANDESCENT LAMP CO.

Havemeyer Building.

SAN FRANCISCO :

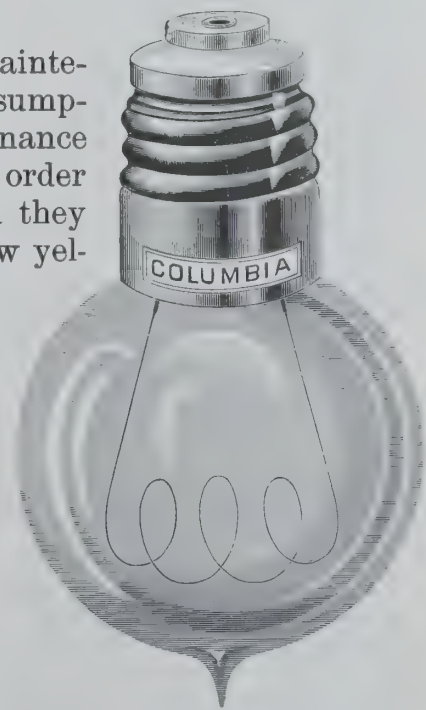
PAUL SEILER ELECTRICAL WORKS.

Mention this paper.



The above cut shows exact size of our regular Standard Lamp.

In correspondence with us relative to prices please state the candle power and voltage of lamps desired and the style of socket they are intended to fit.



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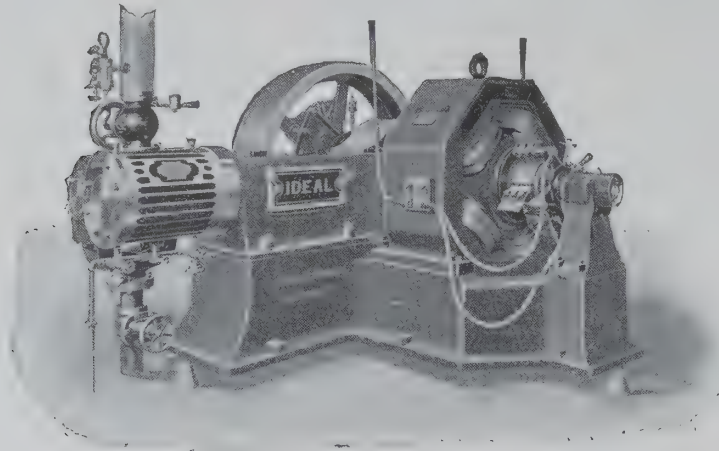


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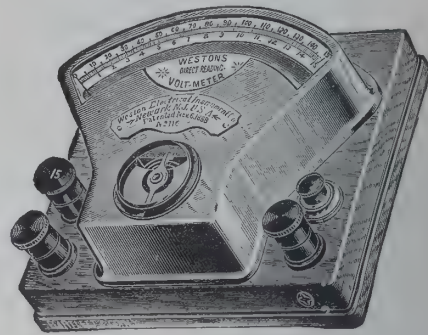
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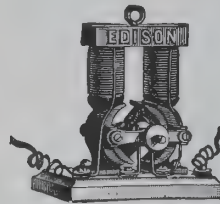
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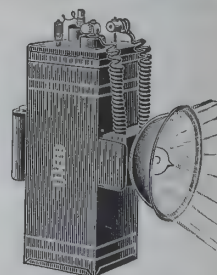
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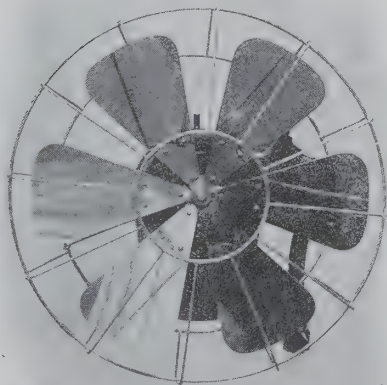
This paint is guaranteed to be a perfect protection to  
the bottoms of wooden vessels, for one year, when ap-  
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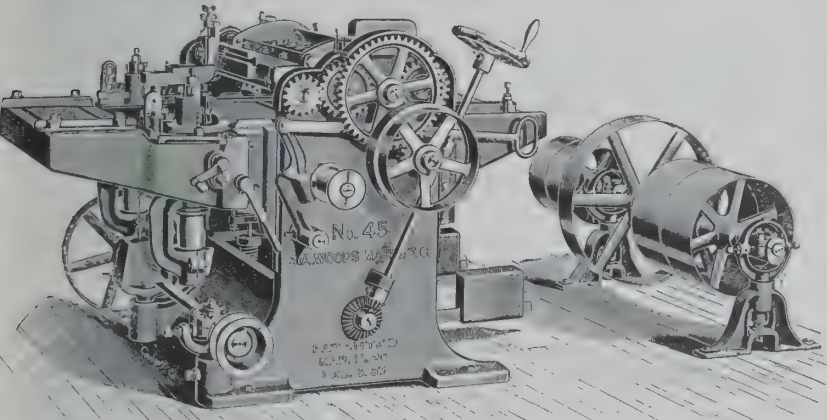
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HARRY LOUDERBOUGH, Proprietor,  
JERSEY CITY, N. J. U. S. A.

**REMARKABLE FACT.**

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.  
MILLS EDWARD. Master Schooner "Florence Shay."



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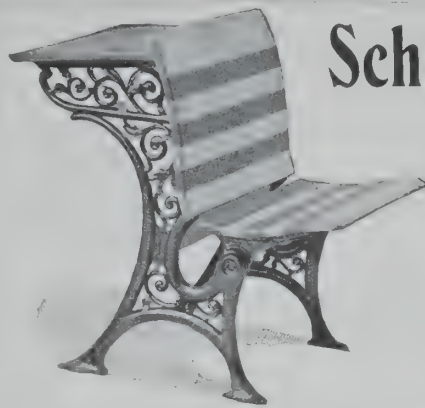
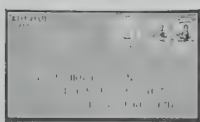
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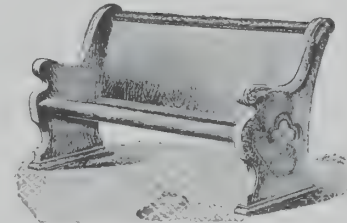
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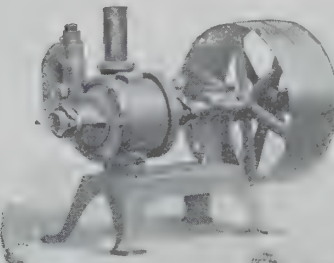
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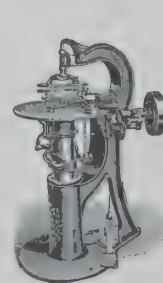
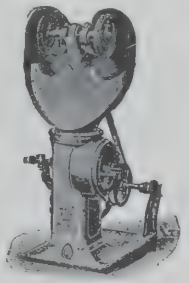
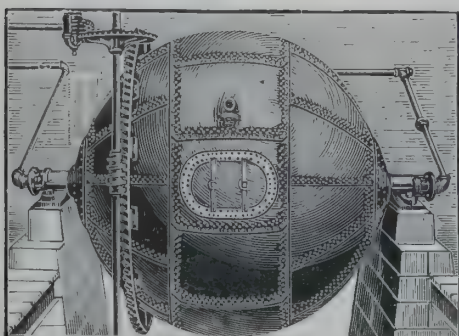
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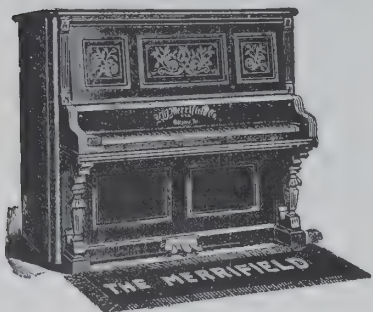
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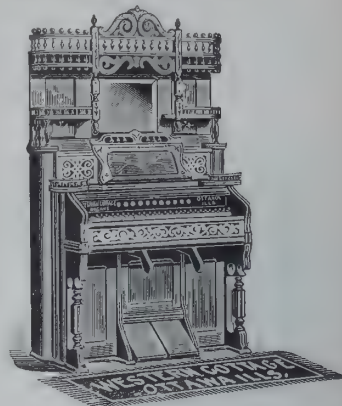
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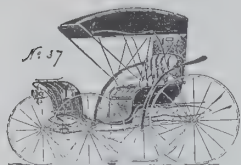
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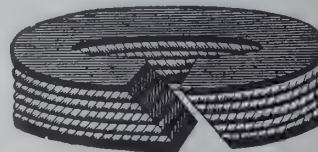
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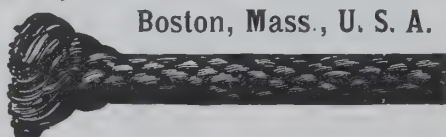
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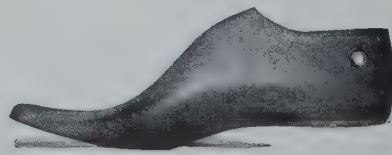
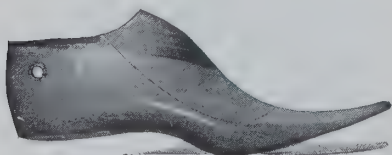
Full Line of Men's,  
Women's and Children's

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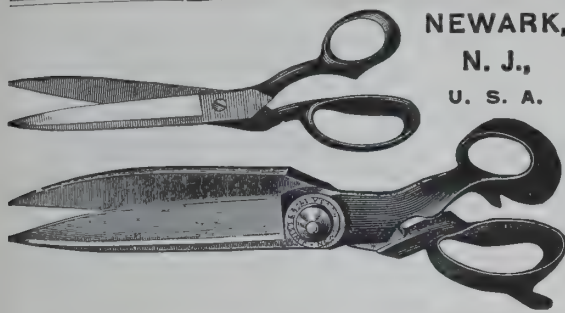
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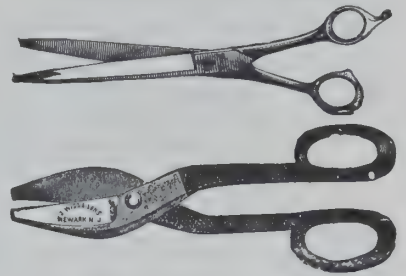
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Twist Drills made by this Company are HOT FORGED by an Entirely New Process.



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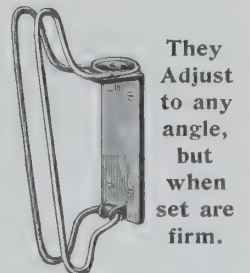
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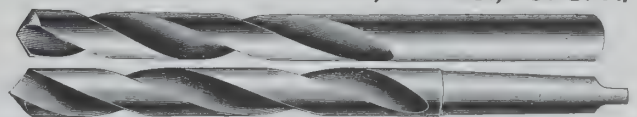
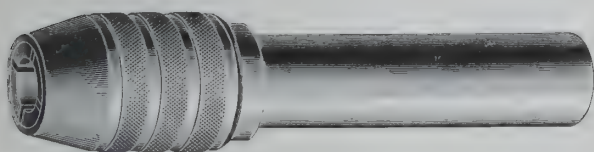
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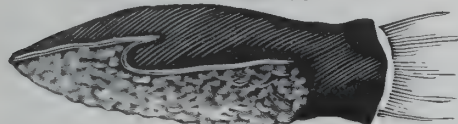
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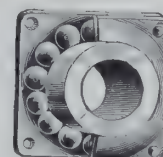
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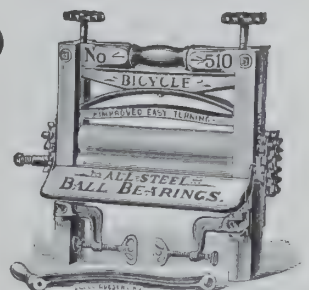
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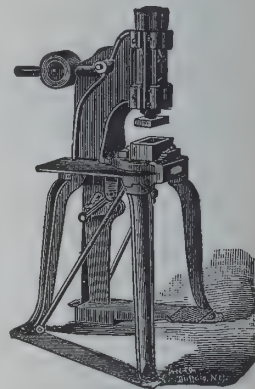
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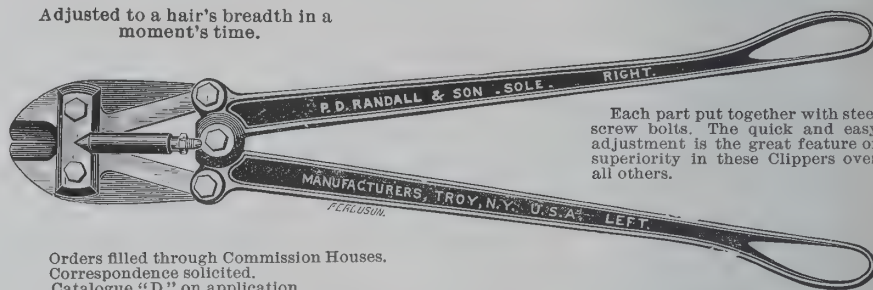
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No weak spots in the whole Clipper. Knives tempered in the most careful manner. Every Clipper thoroughly tested before it leaves our factory. No. 3 cuts  $\frac{3}{8}$  inch or less; No. 4,  $\frac{1}{2}$  inch or less; No. 5,  $\frac{3}{4}$  inch or less. Address

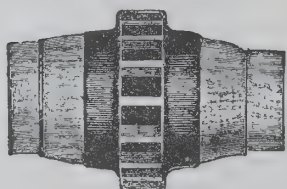
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Adjusted to a hair's breadth in a moment's time.



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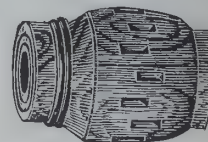
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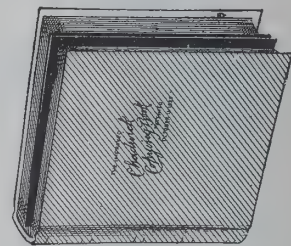


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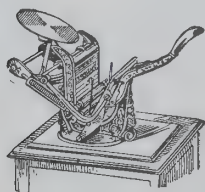
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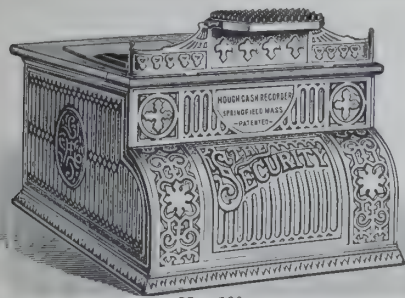
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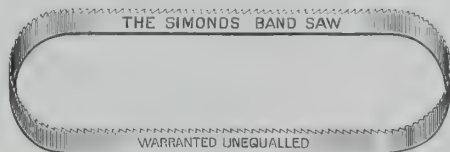


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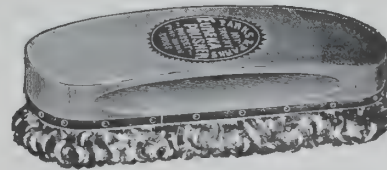
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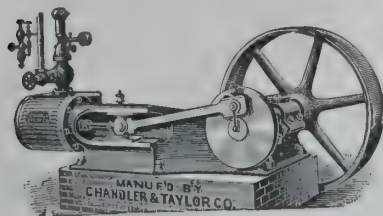
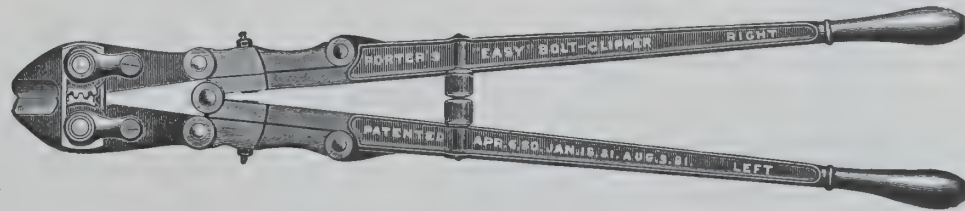


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**IS THE BEST.**

MANUFACTURED BY

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**STRONG.**

**WELL BUILT.**

**SERVICEABLE.**

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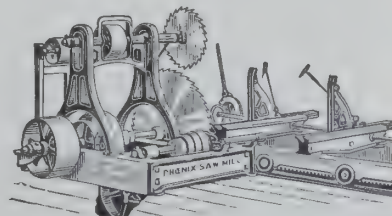
12 to 100 Horse Power. Suitable for Heavy Continuous Work. Every Engine TESTED under full load.

**Suitable Portable and Stationary BOILERS**

On hand for immediate delivery.

CIRCULAR SAW MILLS for all classes of work and MULAY MILLS for Light Power. Send for Circular "C."

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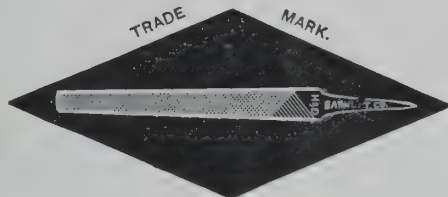
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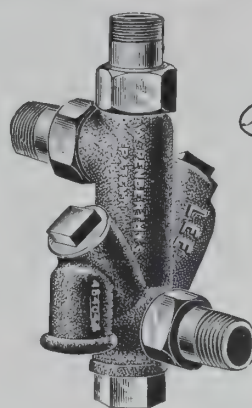
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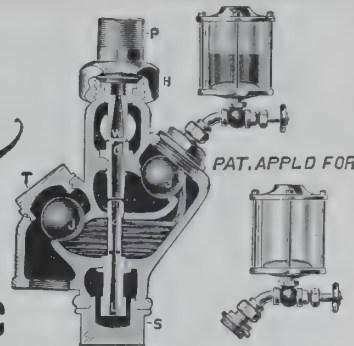
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Marine and Stationary Gas and Gasoline

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We manufacture Propeller, Side Wheel and Stern Wheel  
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Is most desirable for sheds and porches, also for barns, stables, outbuildings, etc., where "no smoking" is desired. This is an extra fine Lamp, made in three sizes, has no chimney, and no complication to make trouble of any sort. It has an improved burner and outside wick regulator; gives a very brilliant light that the strongest wind cannot quench—and, in general, it gives universal satisfaction. The list prices of the three sizes of this lamp are \$5.50, \$6.50 and \$8.50, and the export discount 40, 10 & 5 per cent.



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60 Lighthouse Street, New York, U. S. A.

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ARE THE  
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NEATEST, SAFEST, EASIEST**  
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**BEST ROLLING LADDERS**  
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To save delays, order at once with the following measurements, viz.: Height from floor to top of base shelf; Width of base shelf to front edge of shelving; Height from base shelf to top of shelf where track is to be fastened. State the number of feet of track wanted and the length of pieces required, so that joints of track will meet at partitions in shelving. The pieces of track are to be as near to as possible, but inside of 18 feet long. State the number of brackets required to hold up track.

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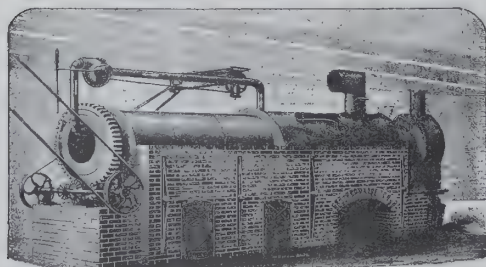
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New Furnace Dryer and Snuff Toaster ..... \$ 950.00 net.  
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The Finest Mustard manufactured on this or the European continent.

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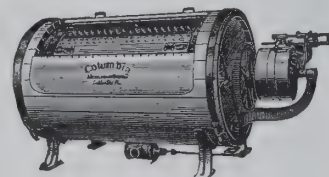


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361-363 Washington Street, NEW YORK, U. S. A.  
Agents wanted in principal cities, and correspondence solicited.

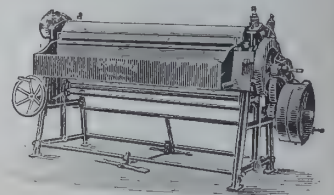
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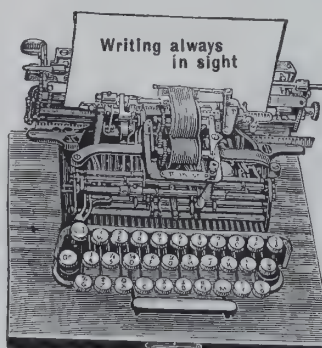
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The Highest Grade Standard Machine.

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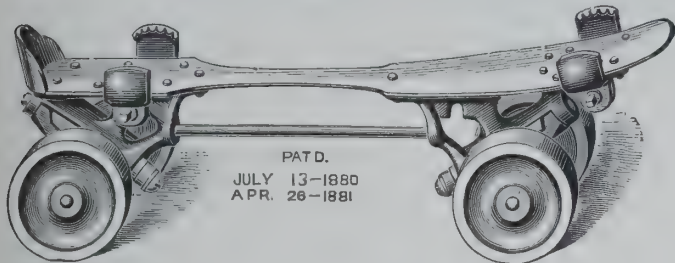
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**THE SAMUEL WINSLOW SKATE MFG. CO., Worcester, Mass.,**  
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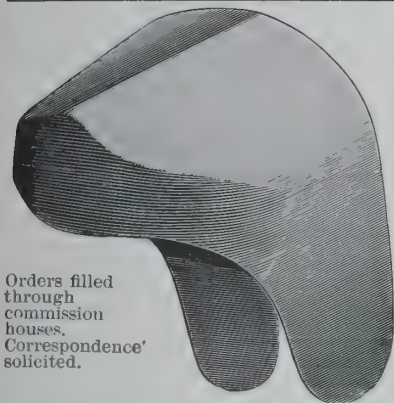
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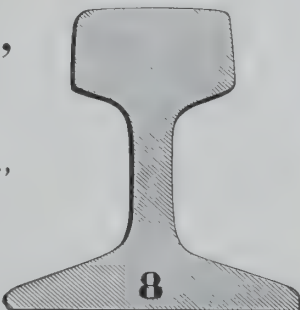
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 Always a clean, accurate, uniform copy.

Price of  
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I came from hands of crafty skill,  
 I'm made of toughest metal.  
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 A problem old to settle.  
 No slimy rags nor blotters dank,  
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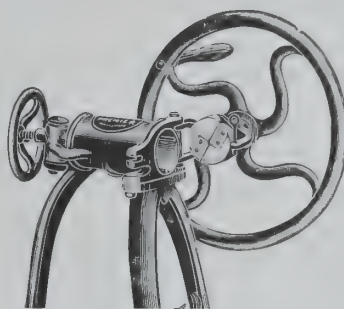
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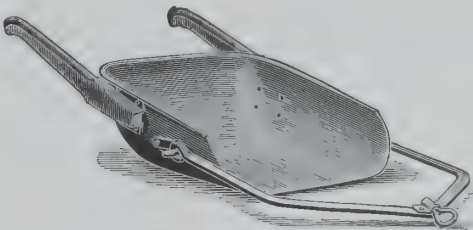
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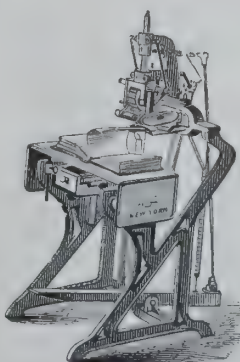
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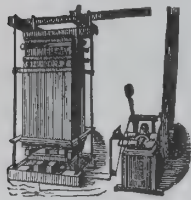
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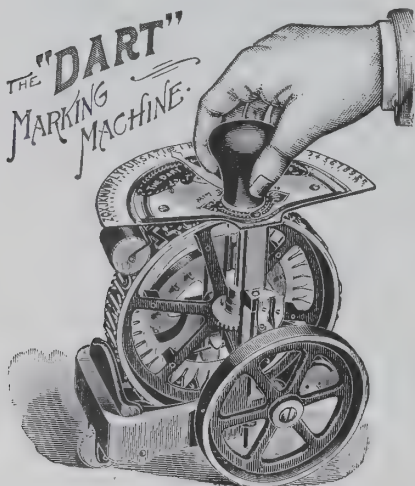
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The Hydraulic Press is the most powerful press made.

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Manufacturers of Smoking and Plug Tobacco Machinery.

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Folding Bath-tub, adult,	\$75.00 per doz.	Folding Camp Table,	\$21.50 per doz.
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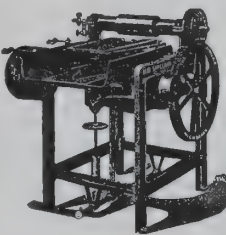
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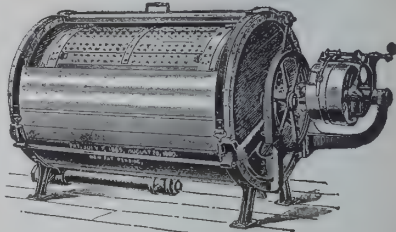
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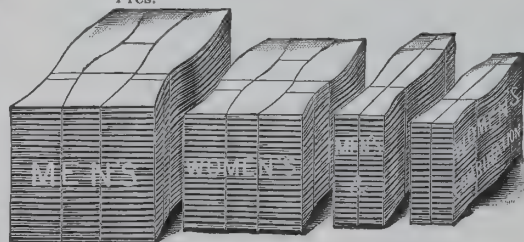
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Men's Right and Left, 7 to 12;

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Men's and Women's Combination Soles, all cut from Best Union Backs.

Orders filled through Commission Houses.

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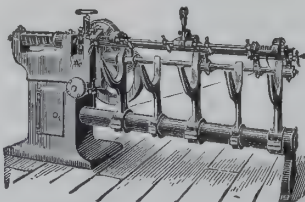
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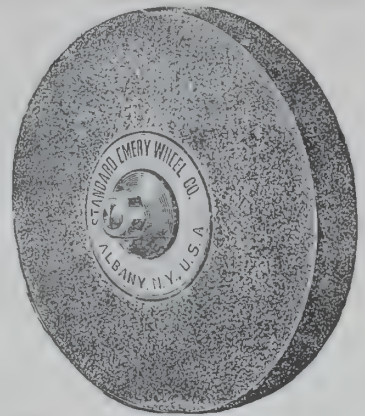
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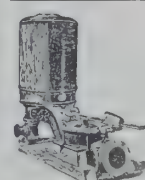
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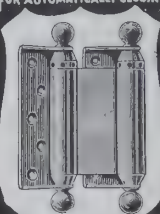
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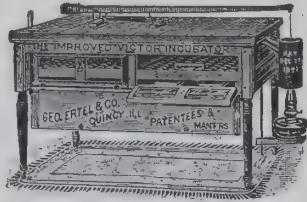
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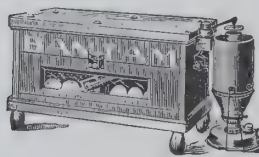
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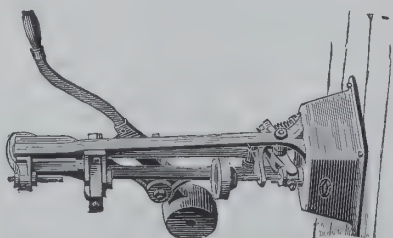
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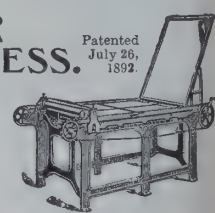
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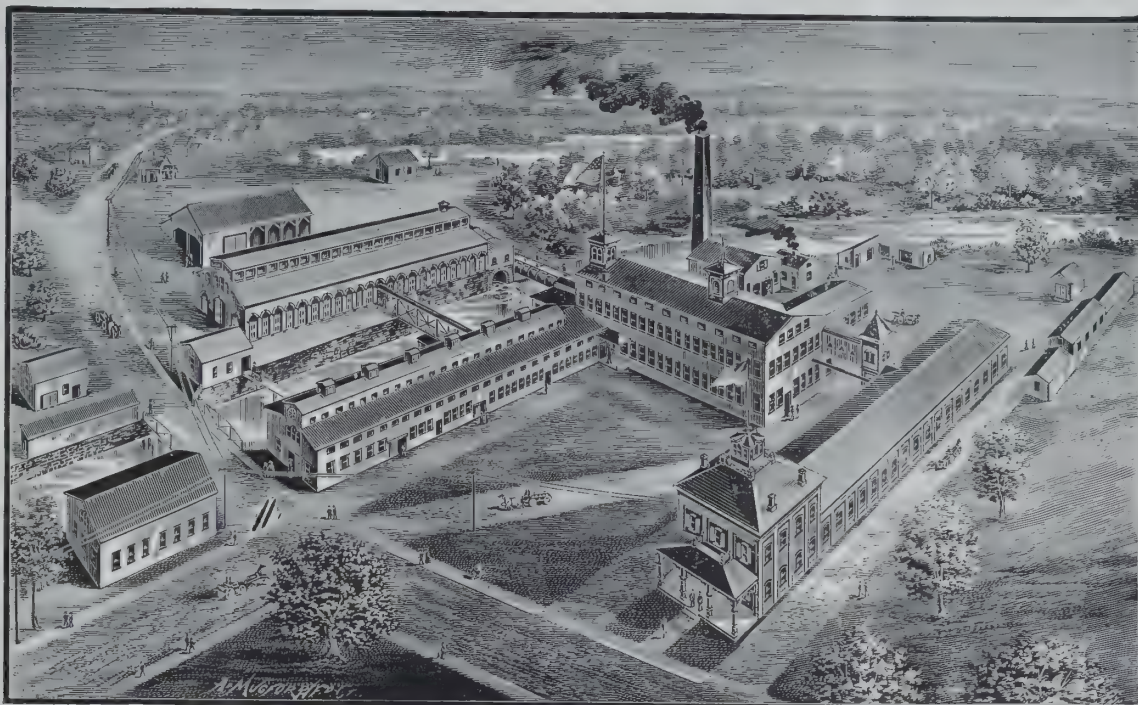


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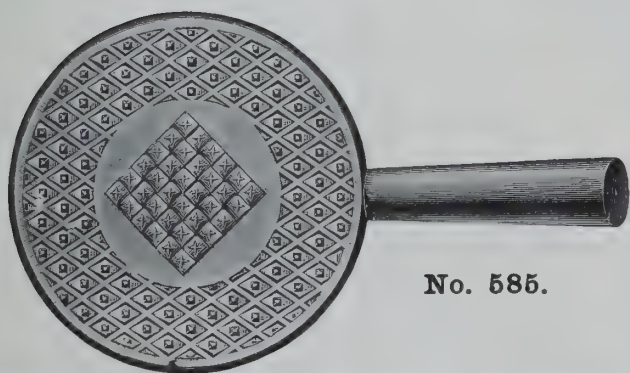
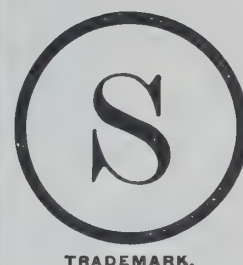
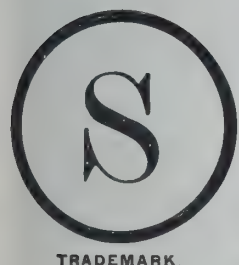
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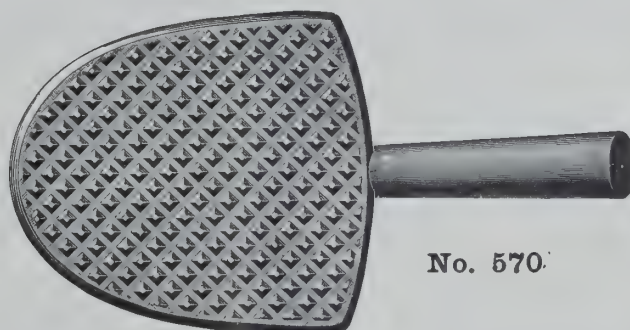
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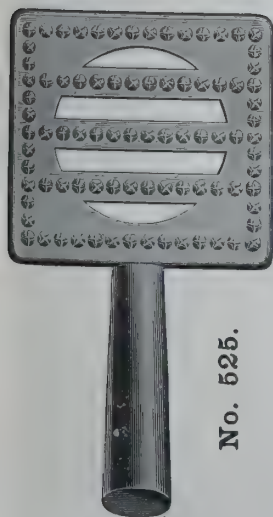
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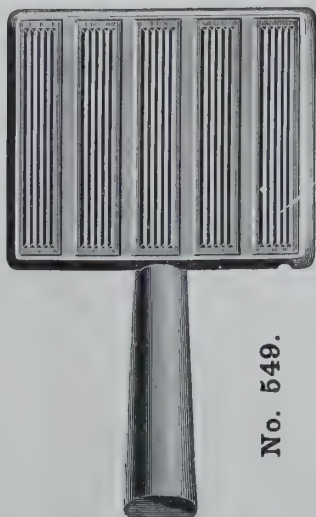
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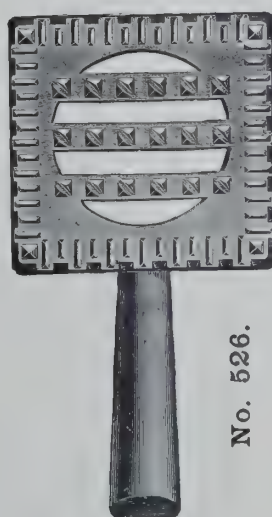
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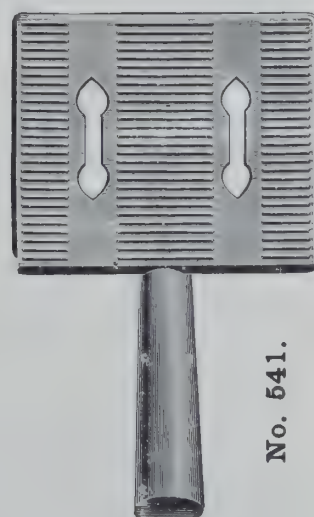
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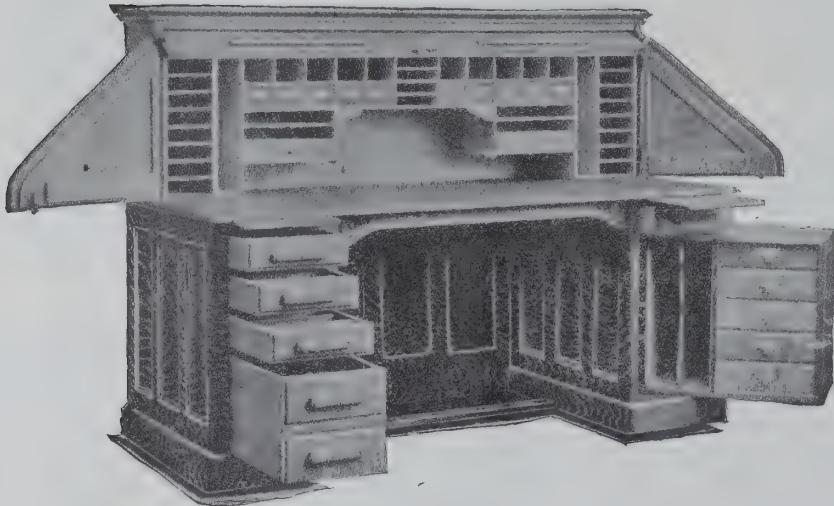


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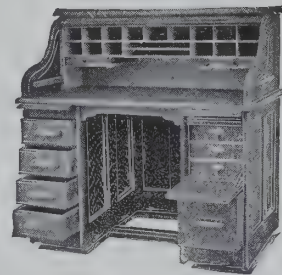
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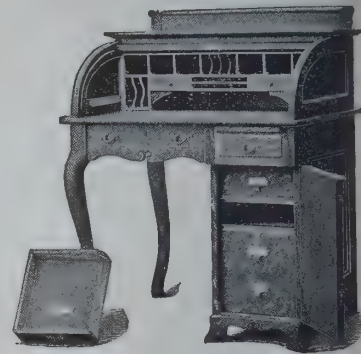
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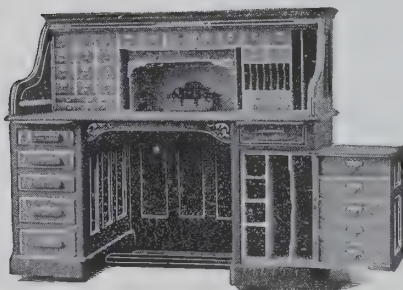
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**\$19.75** buys this desk exactly as illustrated. It is 48 inches long, 30 inches wide, 51 inches high. It has quarter-sawed oak front, closed back and THREE LETTER FILES in right pedestal under lock and key. This desk has been a GREAT SELLER.



NO. P. 243, STYLE "B."

**\$17.00** buys this desk exactly as illustrated. It is made of quarter-sawed white oak and is supplied with LETTER FILES and large drawer in right pedestal. Size, 86 inches long, 28 inches wide, 44 inches high.

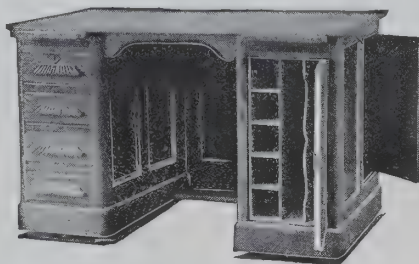


NO. P. 212, STYLE "A."

**\$43.50** buys this desk exactly as illustrated. It is 60 inches long, 33 inches wide, 52 inches high. It is an extra fine desk, made of quarter-sawed white oak and has FIVE COMPLETE LETTER FILES in the right swing pedestal.

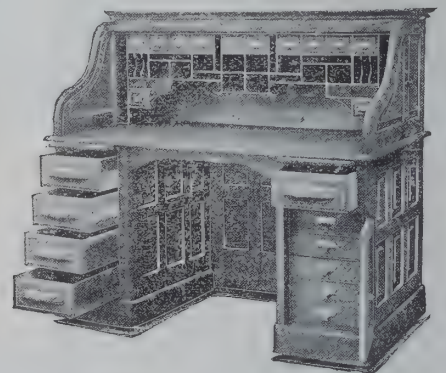
60 inches long, style "A," \$43.50.  
Style "B" or "C," \$40.00

**NOTE.**—Style "A" has drawers in left pedestal and letter files in right pedestal as illustrated. Every person must have some place for letters, invoices, receipts, etc. Style "A" provides complete LETTER FILES within arm's reach, dust proof and under lock and key—a very desirable feature. Style "B" has drawers in both right and left pedestals. Style "C" has drawers in left pedestal and book cupboard in right pedestal.



NO. P. 216, "C."

**\$11.60** buys this desk exactly as illustrated. It is 50 inches long, 30 inches wide, 31 inches high. It has closed back and is made of selected oak. Style "B" or "C," \$11.60.



NO. P. 241, STYLE "A."

**\$35.00** buys this desk exactly as illustrated. It is 55 inches long, 32 inches wide, 51 inches high. It is made of the best figured quarter-sawed oak or cherry, and has FIVE COMPLETE LETTER FILES in right pedestal.

50 inches long, style "A," \$32.50. Style "B" or "C," \$27.50.  
55 inches long, style "A," \$35.00. Style "B" or "C," \$30.00.  
60 inches long, style "A," \$37.50. Style "B" or "C," \$32.50.

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ALL PRICES given above include cost of boxing and delivery to New York City ready for export.

ALL DESKS are made of the best quality of white oak and are supplied in either light, medium or dark finish to suit purchaser, medium being supplied unless otherwise requested. All our desks are finished with best quality of piano polish finish.

ORDERS: We are well known to the leading export merchants of New York City, any of whom will be pleased to execute orders for our goods.

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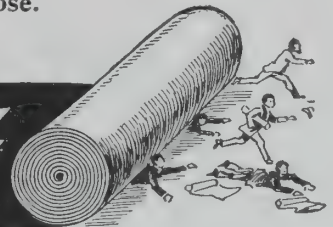
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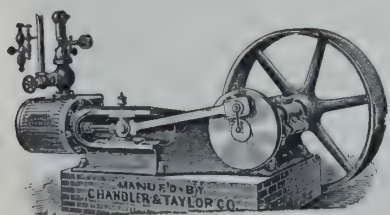
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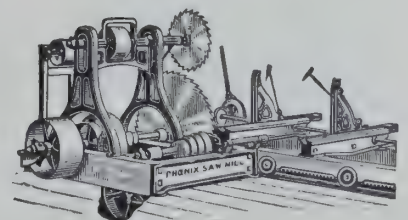
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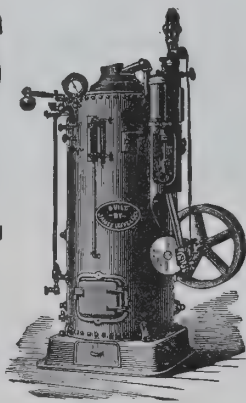
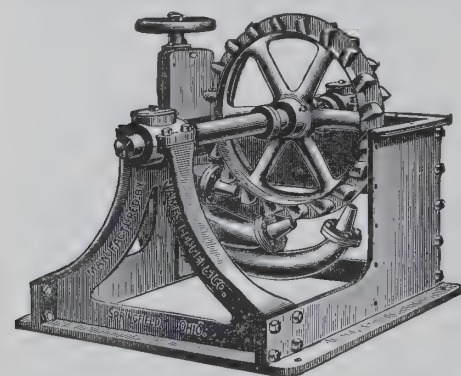
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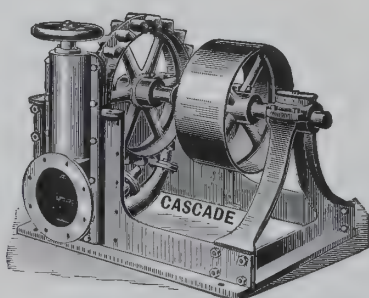
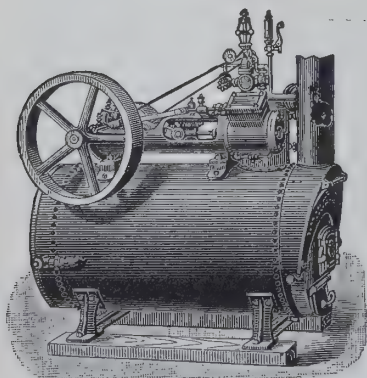
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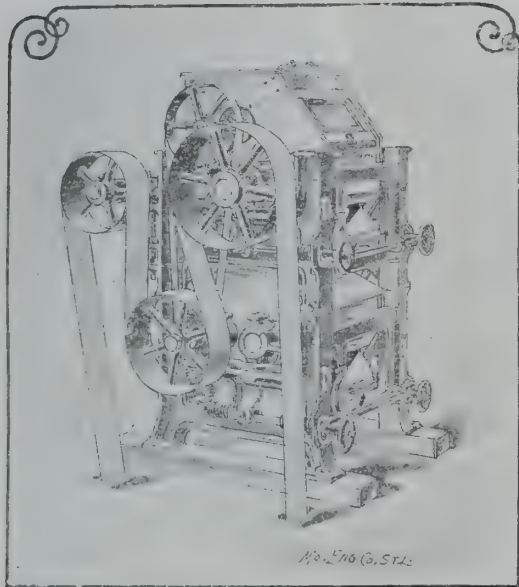
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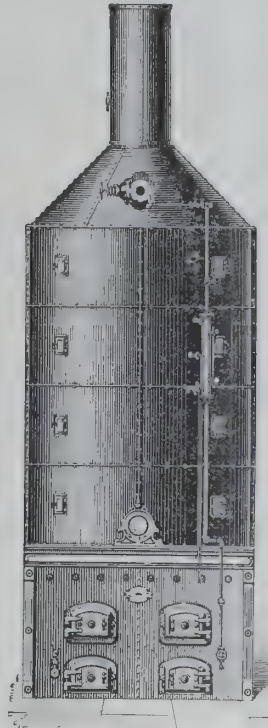
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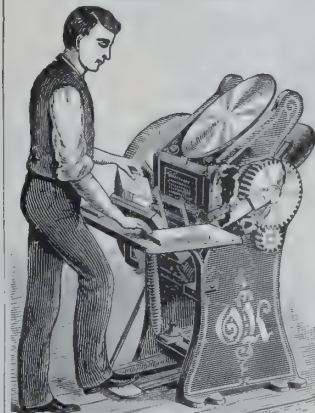
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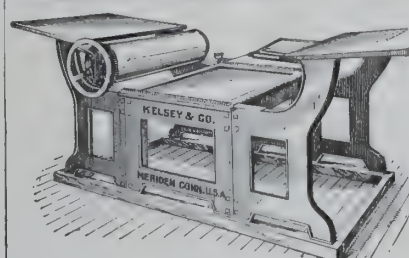
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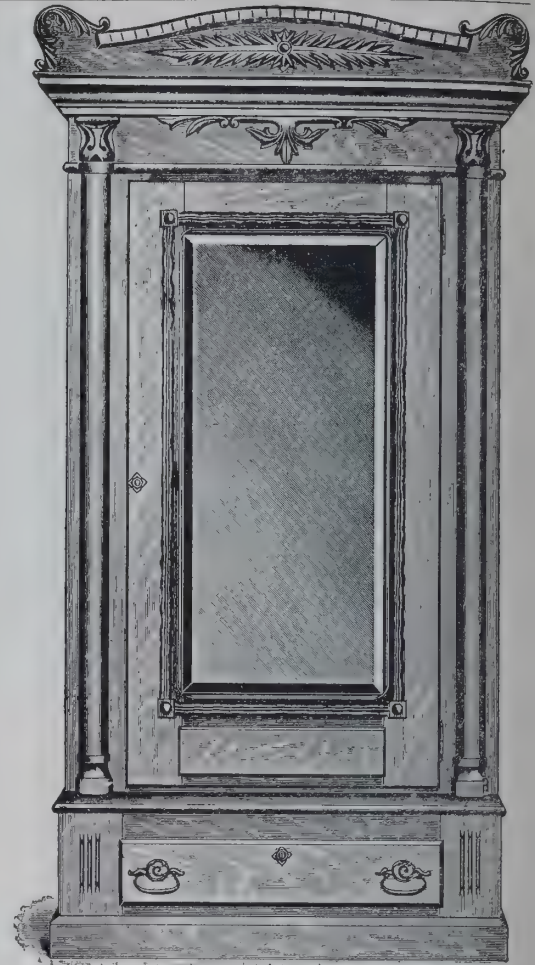




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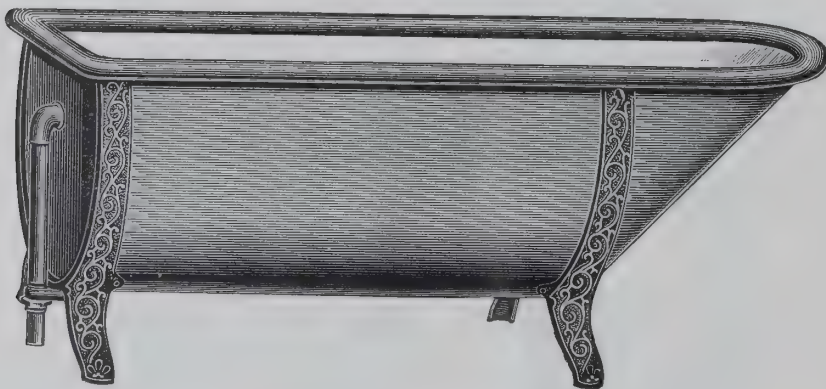
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Will heat sufficient water  
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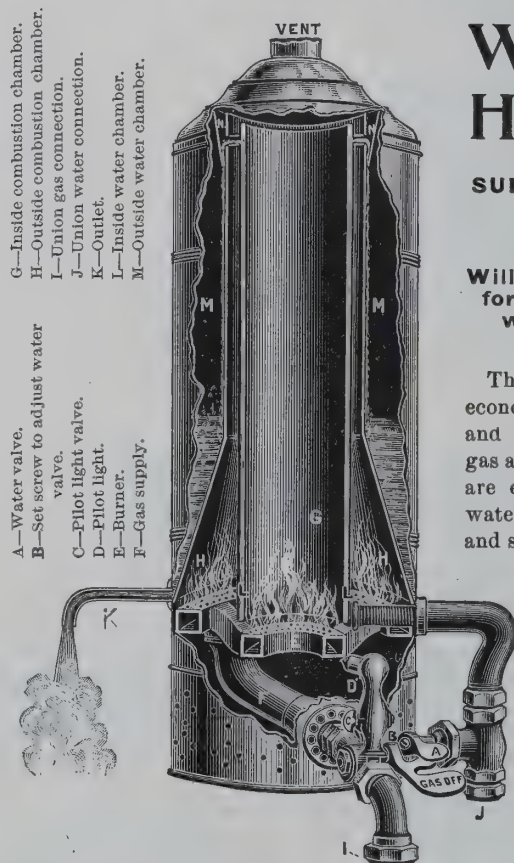
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## THE JOHN C. COCHRAN CO.

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## AMERICAN FOREIGN TRADE IN THE EVENT OF WAR.

AFTER nearly two weeks of uncertainty the question whether there is to be war between Spain and the United States, or whether the grave differences now existing between the two nations may after all be adjusted without recourse to arms, is, as this issue of THE AMERICAN EXPORTER goes to press, still wavering in the balance. It is not the province of this paper to discuss political questions except in so far as they concern international trade, and for this reason we have steadily refrained from commenting upon either the disaster to the U. S. battleship *Maine* in Havana harbor or the general Cuban question in any of its aspects. It is not our purpose to depart from this policy now.

But one phase of the existing situation appears to call for thoughtful consideration. We refer to sensational "estimates" of the probable losses of American foreign trade in the event of actual hostilities breaking out. That this is a matter of serious importance we do not deny. But it is a question of facts and not of theories, and no attention should be paid to unfounded rumors and guesses.

The following table clearly shows how the foreign trade of the United States was carried during the fiscal year ending June 30, 1897:

IMPORTS.	
In American vessels.....	\$109,133,454
In foreign vessels.....	619,784,838
By land vehicles.....	35,812,620
Total by land and sea.....	\$764,730,412
Per cent. carried in American vessels, 14.2.	
EXPORTS.	
In American vessels.....	\$79,941,823
In foreign vessels.....	905,969,428
By land vehicles.....	65,082,251
Total by land and sea.....	\$1,050,893,556
Per cent. carried in American vessels, 7.6.	

Our present concern is with the exports. As the table shows, only 7.6 per cent. of these were carried in American ships, and as a large part of the exports carried in American bottoms are agricultural or mining products sent abroad in sailing vessels, only a small part of this 7.6 per cent. consists of exports of manufactures. Of course, in the event of war all American ships will be liable to capture. Two points, however, should be taken into consideration in estimating the amount of this liability. First, that the regular navy of Spain must necessarily have its hands full in maintaining communications between the mother country and her distant colonies, not to mention the fact that it will have the navy

of the United States to reckon with. Second, that the danger from privateers in a modern war is much less than is generally supposed. The prizes worth capturing to-day would be steamers, and for this reason privateers must necessarily be steamers also. The cost of purchasing and equipping steamers and of their maintenance, the difficulty of obtaining coal abroad and of capturing large, fast and probably partially armed merchant steamers and of getting them into port after capture, would all tend to make privateering a very expensive and doubtful financial venture, not to mention the extreme liability of the privateer himself to capture and the probability that any privateer caught without his letters of marque and reprisal would be treated as a pirate by European as well as American warships.

With reference to the vast bulk of American exports—those going in foreign bottoms—there is everything to reassure the timid merchant. Nothing can be more certain than that the right of neutrals will be scrupulously respected by both sides in the event of a war affecting the commercial interests of every first-class power in Europe. International law is explicit on the rights of neutrals and in protecting the property of belligerents when covered by a neutral flag, all American merchandise, other than contraband of war, will be as safe upon the seas after the breaking out of hostilities as in time of peace. Space does not permit us to print at this time the authorities on international law, but careful inquiry reveals an entire unanimity of opinion in support of this view.

There is, and will be, no reason why buyers who are contemplating the purchase of American goods should not send their orders here as usual, or why American firms accustomed to supply, or desirous of supplying, the foreign demand should not continue their preparations.

Commerce is proverbially timid and uncertainty regarding the future may be as destructive of trade as a war. For this reason we trust that by the time this paper reaches its readers an end will have been put to the present strained and unsatisfactory situation. But whatever the outcome, buyers should not permit themselves to become the prey of exaggerated fears. American trade will go on.

## SIR HENRY BESSEMER AND THE AGE OF STEEL.

WITH the death of Sir Henry Bessemer, F. R. S., Hon. M. Inst. C. E., Hon. M. A. S. M. E., etc., which occurred at London, March 14th, the world loses one of that group of inventors whose achievements have made the century now drawing to a close the most marvellous in the history of the human race. Sir Henry was born at Charlton, Hertfordshire, England, in 1813. He was an inventor almost from the first, and early had command of the means for developing and pushing his inventions. While the Crimean War was in progress he was engaged in experiments with projectiles for the guns of that period. These turned his attention to the need of a better material than cast iron for artillery, and his efforts were at once devoted to systematic investigations and experiments along this line.

After about a year, in 1855, he succeeded in devising a process of decarbonizing iron by blowing air through the molten metal and took out his first patent on the Bessemer converter. At that time the decarbonization of the molten iron was effected by puddling, which was a long and laborious process. The new process brought the air to the iron instead of the iron to the air. The following year Mr. Bessemer read a paper before the British Association describing his invention. The paper made a sensation. There was a great diversity of opinion among engineers as to the merits of the new process, but within a month five firms had purchased licenses to use it, paying the inventor \$135,000.

The invention was not at first a complete success, however, the product being uncertain and occasionally unmerchantable. The use of spiegeleisen for recarbonizing and deoxidizing after the blow perfected it. The credit for this improvement was claimed by Mr. Robert Mushet who attacked Mr. Bessemer's patents. The courts sustained the latter who, however, acknowledged his indebtedness to Mushet by allowing him a small annuity. By 1862 every



obstacle had been triumphantly overcome and a magnificent display was made at the second international exhibition held in London that year of articles manufactured from Bessemer steel. From that date the process came rapidly into use, numerous licenses being granted in Great Britain and other countries.

In itself the Bessemer invention was as much a mechanical as a chemical one. The process in its entirety is not merely the burning out of the carbon by the blast of air, and the subsequent addition of a carefully determined proportion of carboniferous material, but it is also the quick and easy manipulation of great masses of molten metal. To the complete success of Bessemer's work the business faculty, as well as that of the inventor pure and simple, was necessary, and the persevering force or personal momentum to carry him through or over every obstacle. All that was thus needed appears to have been marvellously combined in the man.

Mr. Bessemer's inventive faculties were not confined to this single line; the variety of fields that he explored is shown by the fact that at the first international exposition at London in 1861, he exhibited a centrifugal pump, a separator for sugar refineries, and a machine for polishing glass, all of which were at the time in successful operation. Most of his time was, however, absorbed in steel manufacture and the present perfection of the Bessemer process is almost entirely the work of the original inventor. Mr. Bessemer was, perhaps, the most richly rewarded inventor known to history. Wealth beyond the power of a single individual to enjoy became his, and he received titles and honors from learned societies and governments all over the world.

All this and more was, beyond question, merited by the magnitude of the service his invention rendered to mankind. Prior to 1856 the entire production of cast steel in Great Britain was only about 50,000 tons annually, and its average price, which ranged from £50 to £60 per ton, was prohibitory of its use for a great number of the purposes to which it is now universally applied. Last year the production of Bessemer steel in Great Britain was 2,141,791 tons, while the United States produced no less than 5,475,315 tons. With this vast increase in production has come a corresponding fall of prices, until now the cost of steel is so low that a carpenter who drops a steel nail will lose more by stopping 10 seconds to pick it up than the nail is worth. The hundreds of thousands of miles of steel rails that bind States and continents together, the vast aggregate of the steel shipping of the world, represent but two of the directions in which the great invention of Sir Henry Bessemer has made possible the progress of the age. The mind is scarcely able to grasp the achievements already accomplished, not to consider the boundless possibilities of the future that spring directly from this invention. Perhaps the most astounding thing of all is the fact that this mighty Age of Steel that is culminating in so many wonders at the close of the century is barely 30 years old. The inventor who made all these things possible will rank in human history with the discoverer of America and the inventors of the printing press and the steam engine.

#### COMPARISONS—"ODIOUS" AND OTHERWISE.

THE AMERICAN EXPORTER has felt impelled somewhat frequently of late to reprint articles, or portions of articles, that originally appeared in some foreign publication bearing directly upon the products or the industrial methods of the United States. This we have done for two reasons: First, because the matter itself appeared likely to be of interest to our readers, who, from the very fact that they read this publication, are interested in whatever pertains to America; and, secondly, because some of the points made by the writers of these articles were in the nature of testimonials—often by experts—to the genuine value of the products or methods in question. Such testimonials it seems to us are sufficiently important to deserve as wide a publicity as we can give to them. While we have never knowingly made a claim for the products of this country that is not literally and absolutely true, we cannot but expect that such unsolicited testimony from authorities well known

in their respective localities will carry even greater weight than our own statements.

It occasionally happens, however, that the subject matter of some of these communications is such that it involves a comparison between the methods or products of the country of the writer and those of America. We wish our readers to feel that in printing such comparisons we do not necessarily indorse them. In our editorials we refrain as far as possible from instituting comparisons, and we endeavor to eliminate them from our reading pages wherever it is possible to do so without mutilating a quoted text. We do not believe in comparisons, whether favorable or hostile. They are all "odious," since they are all apt to be more or less misleading.

The industrial situation in two great nations such as, for example, France and Great Britain or Great Britain and the United States is very complex. Each country possesses vast amounts of capital engaged in industrial enterprises, vast numbers of industrial plants, each containing numerous and varied machines and turning out probably products of many grades. The inventive and mechanical ability of each is high. No comparison could be instituted with safety between two such countries, either with respect to equipment or output, since no one could so inform himself regarding the conditions existing over two such wide fields as to be regarded as an entirely competent witness.

It is neither necessary nor desirable for a paper like this to "claim everything in sight" for the country it represents. While we are avowedly advocates of American products, and our mission as a newspaper is to promote their introduction into foreign lands, we are not at all called upon to be blind to the good things of other nations or ignorant of the fact that there are points where they surpass us just as completely as, we believe, we surpass them at others. It takes two to trade as well as to quarrel. If any country surpassed the whole world in the quality of its products, and produced everything necessary to its comfort and happiness, there would be no need of its buying anything of its neighbors. Under such circumstances we doubt very much whether that nation would continue to sell much to its neighbors, since such a trade would be too one-sided to long endure. But as far as America is concerned this is very far from being the case. The nations of Europe sell to us a great deal more each year in manufactured products than we sell to them. While they are excellent customers of the United States, and we trust will be still better customers as they learn more regarding the quality of our products, we are even larger customers of them.

Our aim is, while avoiding specious claims and misleading comparisons, to furnish all who are interested in American goods with trustworthy information about what American inventors and mechanics are doing, and with the reasons for the success of specific machines or methods that have originated here and are not yet sufficiently known abroad. As the field of industrial activity here is a very wide one we cannot enter into technical details or explanations. In our advertising pages we print each month the names and specialties of a large number of American manufacturers who will gladly supply such information to those of our readers who desire to avail themselves of such information or suggestions as our columns contain.

#### THE CHEAPEST MACHINERY—LABOR-SAVING CAPACITY.

IN our last number we discussed some of the factors that reduce the cost of machinery production and so make low prices to the consumer possible. But the wise buyer regards the price charged for a given machine as of minor importance as compared with the amount of labor it will save. He knows that if there is another machine on the market (which his rivals can buy) capable of doing the same work with greater rapidity or evenness, or at a lower cost for attendance, whatever he may save in the lower price of the inferior machine will be quickly offset by the permanent and increasing advantage enjoyed by his competitors owing to their superior equipment. The real question that must determine his



selection is not, then, "What is the price of this machine?" but "What can it do?"

Hiram S. Maxim in a recent article in the *Engineering Magazine* described very happily the two extremes in machine construction and use as they exist in the world to-day.

The Turkish metal worker is able to produce some very remarkable results, as far as appearance is concerned, with the simplest of appliances. The primitive Turkish lathe is an exceedingly simple affair, but it requires a great deal more skill to execute a piece of work on one of these lathes than to work any of the high class tools that one finds in Western Europe or America. A Turkish pistol may be of a highly ornate character, and, to the casual observer, may appear an excellent piece of work, but it will not bear close examination, as there is nothing approaching accuracy about it, and, of course, no two pistols are alike in any of their measurements. The Turk may be said to represent the extreme Eastern system, where great skill in manipulation and very few tools are employed, and where everything goes for show and nothing for accuracy, while the Americans may be considered to represent the extreme West, where the tools are of the very highest character, and the skill necessary to operate them (not to make them) may be easily and quickly acquired. Nothing is sacrificed in an American pistol for ornamentation, but the accuracy of the work is something remarkable, and all pistols of the same class are exactly alike, and all their parts are interchangeable. All the work on a Turkish pistol has to be executed by an old and experienced mechanic; great skill in manipulation and taste are a *sine qua non*; but the elegant and accurate work that one finds in American pistols is executed for the most part by unskilled workers. The skill—or, as one may say, the brains—is in the accurate tools, or, rather, in the men who designed and made them, and not in the simple operatives who attend to them.

The Turkish lathe above described would be a very expensive machine for a pistol-maker to put in his shop, no matter how trifling its cost might be. The modern manufacturer, be it of pistols or of bicycles, who aims to surpass both in the quality and the cheapness of his products, is simply forced by the keen competition of his rivals to adopt the most efficient labor-saving devices. Not only must his machinery displace as many hand laborers as that of his competitors, but it must be as cheap to operate. If in his shop a skilled mechanic has to be placed in charge of each machine while somebody else can make the same goods by means of machinery so automatic that a single boy or girl can and actually does operate a dozen machines then the difference between the annual wages of twelve skilled mechanics and those of one girl represents the amount of the vast handicap under which he labors.

The labor-saving capacity of machinery is well worth the consideration, not only of all who are engaged in strictly mechanical pursuits, but of many others as well. For example, a banker, lawyer or commission merchant might regard the question of the employment of labor-saving devices as of very little interest as far as their respective businesses were concerned. Yet each would find on investigation that the employment of a typewriter or writing machine, and quite likely of a mimeograph, would save him many dollars in clerical hire and expenses for copying and duplicating, not to mention the vast improvement in the appearance of his correspondence that would be effected. In America the use of these office devices is now almost universal, and we are confident that the same will shortly be true of Europe.

Another industry in this country that has been fairly revolutionized by the introduction of labor-saving machinery is the laundry. Steam laundries are now in successful operation, not only in every large city, but in hundreds of towns where the washing can be brought in easily from the surrounding country districts. So universal has become the use of the numerous types of laundering machines, owing to the fact that they replace from five to fifty operatives, that before long little hand work will be done except by the Chinese whose low cost of living enables them to continue to compete with machinery. Abroad, these machines are now rapidly coming into general use as the prejudice against doing this work by machinery wears away. There, as here, the public will quickly learn that the machines do not injure the clothes, as their hand-working opponents invariably claim, and that the quality of their work is surpassed only by the most painstaking and skillful hand operatives.

But it is in the factory that American inventiveness has made the greatest strides. A single instance must suffice from the legion of wood-working devices. Fifteen years ago practically all the

carving on ornamented furniture was done by hand, and wood-carvers were able to command very high wages indeed, even for this land of dollars. Cheap and medium-priced furniture was necessarily plain, while highly ornamented styles were luxuries accessible only to the rich. Now all this is changed. Wood-carving machinery requiring the attendance of a boy, or at most of a moderately paid operative, now does the work for which many deft-fingered carvers were formerly paid large sums. Of course no machinery can, or ever will, rival the best wood carving, such carving as made the artisans of northern France famous, or as exists in the Cathedral of Amiens. But these machines can none the less do very delicate and beautiful work, and by their aid furniture ornamented with tasteful designs in leaves and flowers, or decorated with the most delicate tracery and the most graceful scrolls, or even adorned with designs imitated very closely from the work of famous hand carvers of the sixteenth or seventeenth centuries can be produced at prices within the most moderate means.

A few months ago THE AMERICAN EXPORTER published an interesting interview with a French officer of engineers who had spent six months visiting the mines and manufacturing establishments of the United States. He expressed himself as far more impressed with the almost numberless devices in use in American shops, designed to save what might at first sight appear a trifling amount of labor, or effect an apparently unimportant improvement, than with the more gigantic and powerful machines. As an example he mentioned a little grindstone automatically sharpening lathe and planer tools.

This machine cost probably as much as a hundred of our ordinary grindstones cost; but I see that it automatically grinds all the tools for 300 high-priced mechanics, and it only works a few hours each day. The skilled mechanics in our country frequently stop their regular work to grind their own tools, and then they do it imperfectly. Your tools are all accurately ground to the best shape by this machine, so that they do more and better work on this account in a given time. I believe that that machine has brains—the brains of the inventor—and it has no doubt revolutionized work of this kind in American shops. This is but one case out of many that I have noted.

Illustrations of the labor-saving capacity of American machines might be multiplied almost indefinitely, and taken from almost every branch of industry. The question is frequently asked by foreigners who have never visited this country, "Why does the inventive genius of Americans so often seek to economize labor?" Abroad, until the competition of the great inventive nations began to stimulate industrial activity the saving of a little labor here and there was not a matter of serious concern. The reason is not difficult to find. In this country the price of labor has always been very high, and the proportion of the cost of producing an article that had to be assigned to wages correspondingly great. Consequently manufacturers have offered every incentive to inventors to reduce the amount of labor necessary to the production of any article as far as possible.

This steadiness of the demand for high inventive ability has produced a condition of affairs that is without a parallel in any other country. Every first-class machine shop, other than those devoted exclusively to the manufacture of a single specialty, possesses one or more men of trained inventive power whose chief business it is to solve such mechanical problems as may be presented to them. For instance, some one designs an article for which he is convinced that there will be a general demand if only he can produce it in sufficient quantities at a low price. To do this special machinery will be required. The designer or inventor takes the article to the builder of machines and says, "Can you make a machine that will make these things, and will you guarantee it to work?" It is altogether probable that after consulting with his force of inventive mechanics the manufacturer will reply "Yes" to both questions. Such special machinery as this is being built to-day in vast quantities in America and is being shipped all over the world.

It is not our purpose to claim that America is the only country where labor-saving machinery is invented. Much excellent work in this direction has been done in France, and the attention of manufacturers was called to the importance of such improvements in England even before industrial development had reached so high



a stage in this country as to render attention to this point necessary. But the hostility of trade-unions has greatly retarded the natural progress of invention along this line in Great Britain, and it is not too much to claim that at present no country offers so extensive and so highly perfected a line of labor-saving machinery as does the United States.

Buyers of machinery should not fail to correspond with one or two American houses before placing their orders. And in this connection we may be permitted to repeat a warning that has frequently been uttered on these pages, and doubtless will continue to be. Buyers should avoid imitations. Certain unscrupulous manufacturers make quite a practice of copying American machines, not infrequently reproducing the name and trademark of the maker. These machines they sometimes offer at low prices, but buyers should remember:

1. That the imitator of any machine cannot make a better machine than the original. If he could he would not imitate it.
2. That he cannot make as good a machine. If he could he would sell it on its own merits instead of trying to secure trade by imitating some one else.
3. That machines manufactured by their originators are always "up to date." It takes time to get an imitation on the market.
4. That manufacturers who do not hesitate to steal other people's inventions will not hesitate to cheat their customers. In so complex a mechanism as a highly specialized machine it is important that the buyer assure himself that the lower-priced imitation will really equal the original in rapidity, in the quality of its product, in durability, in labor-saving capacity—in short that it can meet every test. Otherwise he is deliberately handicapping himself by just so much as his new machinery is inferior to that of his rivals. That machine will be the cheapest in the long run that does the most and the best work, and turns it out in the most highly finished condition, and that displaces the largest quantity of manual labor or skill.

### EXPORTS OF EDUCATION.

IN what are now described in the histories as the "Dark Ages," men who knew more than their fellows sought by every ingenious device to conceal their knowledge and thus to profit by their superiority over their more ignorant neighbors. If a man discovered some easier or better way of making cloth or chain-armor he took every precaution to keep his process a profound secret. Only his sons or most trusted apprentices were taught every detail of the operation. As patent laws were then unknown—and would have been ignored in those rough times had they existed—these were wise and prudent precautions. Indeed, at the present time there continue to exist here and there stray revivals of this ancient policy of maintaining a monopoly in the manufacture of certain articles by simply keeping the method of manufacture a secret. In France, for example, we have been informed that certain processes connected with the manufacture of gloves are jealously guarded secrets for which a patent is deemed too feeble or too brief a protection. In this country the machinery for preparing cane for chair bottoms was at one time, and, so far as we are aware, is to this day protected from imitation in the same way.

But it has remained for our German friends to discover that it is either possible or desirable to establish a system whereby an entire nation might, so to speak, be taken into the confidence of the fortunate possessors of superior mechanical knowledge, while the rest of the world is ruthlessly kept in ignorance. A Berlin dispatch, dated February 26th, says:

A decree was issued by the Government on Thursday last forbidding the future attendance of foreigners in the machinery and engineering department of the Berlin Technical High School, and it has caused much consternation among the foreign born students in Germany, as it is believed to be the forerunner of others excluding them from all similar institutions.

The Liberal newspapers condemn the decree and express the belief that other countries will retaliate by a similar illiberal policy. The Conservative semi-official press, however, applauds the decree and hopes it will be followed by others of a more sweeping and general character. The *Deutsche Zeitung* remarks:

"At the non-Prussian High Schools at Munich, Dresden, Stuttgart,

Carlsruhe, Darmstadt and Brunswick there are 1,200 foreigners out of 8,682 students. We hope that, as the foreigners use their knowledge to the detriment of German industry, the non-Prussian Governments will forthwith exclude them."

We think that the fears of the Liberal newspapers are groundless and that Germany will be permitted to stand alone in the adoption of this peculiarly mediæval policy. While we cordially acknowledge the debt that American scholarship owes to the German universities we are inclined to doubt whether in mechanical and industrial matters Germany possesses such a monopoly of information as to make such decrees a matter of universal concern. At present Germany is undoubtedly ahead of all other nations in the facilities she offers for elementary industrial education, but the gap is gradually being filled as far as America is concerned. As regards advanced instruction we are not sure that it has not been filled already. Just as to-day there are several American universities that have approached the German standard in respect to the arts and sciences—notably Harvard under President Eliot—so there are several great technical schools in this country that have risen to a condition that renders them nearly if not quite equal to any in Europe. The work done in the Massachusetts Institute of Technology and other technical schools of the first class has been the foundation upon which many of our civil and mechanical engineers have achieved those triumphs that have astonished the world.

In electricity we believe that our best American schools are fully abreast of the modern practice on this side of the water, which is as yet considerably in advance of that attained elsewhere. All of our schools are of course open to all who desire to come. The Imperial Government of Japan has recognized the importance of the educational facilities offered here by sending a large number of its brightest students to America to complete their education. It may not be too much to anticipate that as the soundness and progressiveness of American practice, not only in electricity, but in mining, metallurgy, in mechanical engineering and in every branch of industrial economy, come to be more widely recognized we shall see an increasing stream of intelligent young men crossing the Atlantic to study at these American schools. If so they will be welcome. While they may learn much that will make them more dangerous competitors, we are confident that they will learn more that will make them earnest and cordial friends. They will know our people and understand and appreciate our institutions as well as master our mechanical theories. Knowledge, moreover, is a commodity that differs from others in that the more of it one imparts to others the more remains behind. No nation need be ashamed of, or seek to limit, its exports of education.

### "YELLOW" JOURNALISM.

EVERY country is justly judged by its journalism. If the character and standards of its press, and particularly of its daily press, are high the same elevation of education and taste must be attributed to the people these publications are designed to please. If, on the other hand, the newspapers of a nation are, as a whole, coarse and low in sentiment, are sensational and noisy in matter, are utterly devoid of literary style, a harsh opinion must be formed of the character of those for whose perusal such journals are prepared. But in formulating his judgment the foreign reader should exercise due care not to take the abnormal for the typical and not to select mere excrescences as representative of the mass.

This caution is especially necessary at the present time, not only because American policies and events are just now the subject of world-wide attention, but because there has recently sprung up in this country a new class of journalism so conspicuous as perhaps to be taken as typical by those who have never given the matter much thought before. This "new" journalism, as it is sometimes called, is so recent and so extraordinary as to have caused the public to coin, or rather to adapt, a new term to describe it. The descriptive epithet hit upon by public opinion, so unerring in matters of this kind, probably owes its origin to a series of alleged humorous cartoons published by two New York papers describing the adven-



tures of a certain precocious city infant who was known and pictured as "the yellow kid." So hard did the publishers of these papers work their poor yellow kid when once he had been invented that the incident suggested the adjective "yellow" as aptly descriptive both of the papers and their kid. From this the phrase "yellow journalism" came to be applied to the entire class of newspapers to which these two belonged.

Not all of these newspapers are of recent origin, nor are all new recruits to this school of journalism. But the great general public makes no discriminations. All are alike in a blind devotion to sensationalism, in reckless disregard for the truth, in socialistic hostility to wealth and capital, and in contempt for all public institutions and private rights.

Several notable peculiarities place this "yellow" journalism in America on a plane by itself. These papers are not mere gutter sheets such as hawk scandal about the streets of many European cities. Their proprietors are men of vast financial resources who hesitate at no expenditure in the furtherance of their "mission." This mission is a simple one—to "sell the paper." There is a double incentive to sensationalism. First, the building up of a great circulation. These publishers reason that it is better to try for the poor man's cent than for the rich man's dime, since here, as everywhere, there are thousands and tens of thousands who are comparatively poor to one who is rich. The other prize is one that is awarded only after the first has been positively assured, namely, liberal advertising. The amount of money expended in advertising in this country is without a parallel. New York surpasses even London in the volume and variety of its advertising patronage. "Sell the paper," then, is a very practical sort of mission from the standpoint of the publisher. It "pays" to advertise the paper by identifying it with every cause that may make a passing appeal to popular interest or sympathy, to hire writers with brilliant imaginations and picturesque vocabularies—however superficial their real attainments—and to exploit the brutal, the disgusting and the obscene—for by all these means it is possible to sell the paper and profitably dispose of much advertising space.

The development of this "new" journalism into its present status has been very rapid. From the start it has been illustrated, and on the occasion of a great event the space devoted to pictures often equals that given to the text, which is both cheap and "taking." All American papers make a practice of printing display heads at the top of each column, using type that varies in size and blackness according to the editorial judgment as to the importance of the event. But soon one column became too small to contain the emotions of these "yellow" papers. The headings sprang to two columns, to four, from four to six, until now it takes letters 3 inches high, and black in proportion, running clear across the first page, to announce anything out of the ordinary. It has grown from a shout to a scream, then to a shriek, and now it is a screech. It is to be feared that if anything really serious should happen these papers would lose their voices altogether.

The "progress" in the editorial policy has on the whole about kept pace with that of the composing-room, and has been in the same direction. In every land there have been papers that for the sake of making a sensation would magnify a vague rumor into the wildest announcement of assured fact, and deliberately suppress the truth if it appeared so inopportune as to interfere with the sale of an "extra." There have even been newspaper forgeries and fake dispatches, but these were usually in times of great excitement. These "yellow" editors, however, quickly perceived the usefulness of having news manufactured to order of exactly the size and quality required to fit the occasion. In their editorials some of these papers have displayed a cynicism and recklessness that are without parallel in American journalism. Papers loudly styling themselves "American for Americans," and reviling all that are not as sensational as themselves as "unpatriotic," do all in their power to undermine public confidence in the Government on the eve of a national crisis and strive with might and main to place the country in a false and unworthy attitude before the world.

We trust that no one in other lands will be deceived for a

moment by this journalism. It is not representative nor typical. Its ravings are treated with contempt by all thinking men on this side of the Atlantic and no importance should be attached to them in any quarter. The great mass of American journalism has been dignified and judicial in the recent crisis. It has been honorable and consistent. It has sought to allay popular passion, not to inflame it. It has known how to uphold national honor without trailing in the dust every sentiment of fair play and decency. Sham sentiment and mock heroics will always deceive the more ignorant and thoughtless, at least for a time, but calm judgment will readily distinguish between the false and the true.

#### AGRICULTURAL MACHINES FOR RUSSIA.

In June, 1897, the Russian Minister of Finance appointed a committee to look into the question of duties on agricultural machinery with a view to modifying them, so that the agriculturists might have every opportunity to equip themselves with the most modern appliances at the most advantageous rates. In January we published a resumé of the recommendations of this committee, which were in effect that the duties on certain machines and implements be abolished, that on others reduced, and that a long list of machines not made in Russia, such as sheaf binders, steam plows, compound threshing machines, brickmaking machines, horse rakes, etc., together with all agricultural machines and implements newly invented abroad, be allowed to be imported free into Russia during the next five years. As yet we have no information that these far-sighted recommendations have been adopted and decrees issued readjusting the duties on agricultural machinery and implements in accordance with the suggestions of the committee.

But while the action of the Russian Government in this direction is still delayed it is gratifying to note that American exports of agricultural machinery and implements intended for the Russian market are increasing with phenomenal rapidity. On another page (page 27) we publish some very interesting statistics regarding the rapid growth of this trade and news of the latest shipments from New York. Every indication points to the conclusion that, as would naturally be expected, Russia is finding that the types of agricultural machinery designed for use in our large level prairies in the West are proving equally well adapted for the similar conditions existing on her own vast steppes. American agricultural machinery of every description has stood the test of the keenest possible competition in the home market and we have no fear that it will fail to give a good account of itself abroad.

**Proposed Reforms in the Consular Service.**—After what we had to say upon this subject last month our readers will appreciate what a satisfaction it is to us to record the fact that a bill has been favorably reported by the House Committee on Foreign Affairs, which provides a comprehensive system of classification, confining appointments to persons between the ages of 21 and 50 years, and who must be citizens of the United States. A commission consisting of two members of the Senate, three members of the House, and an officer of the State Department, will assist the President in the work of reorganization.

It is intended to provide examinations to test the fitness of applicants for appointments and promotion, in which no grade is to be overstepped. Larger salaries in proportion will take the place of the fees now in vogue, and the prospects are good for a great improvement to result from this proposed measure, should nothing prevent its passage. We earnestly trust that Congress will not allow its attention to be so distracted by other matters as to fail to pass this important bill. As we pointed out at length last month the needs of our growing commerce abroad demand imperatively the prompt enactment of some such radical reform measure as this. No temporary exigencies, however exciting, should be permitted to sidetrack a matter of such vital and permanent concern to a vast number of our citizens as well as those in other lands who do business with us.



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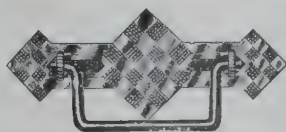
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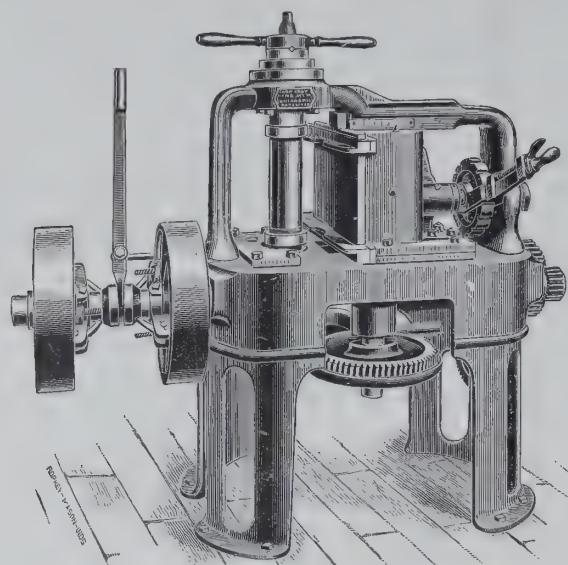


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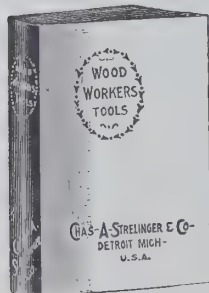
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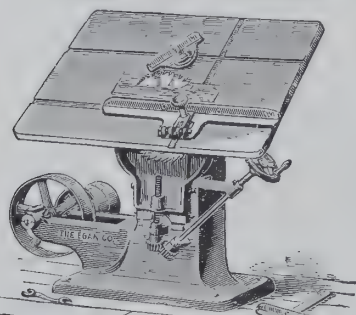
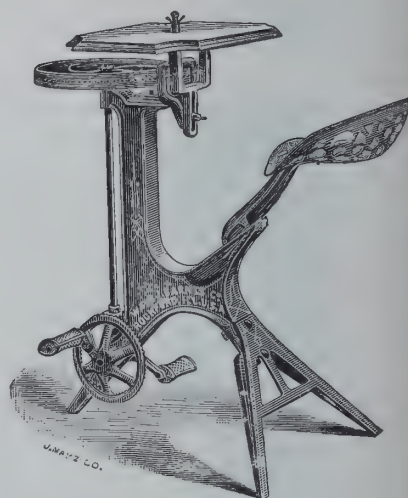
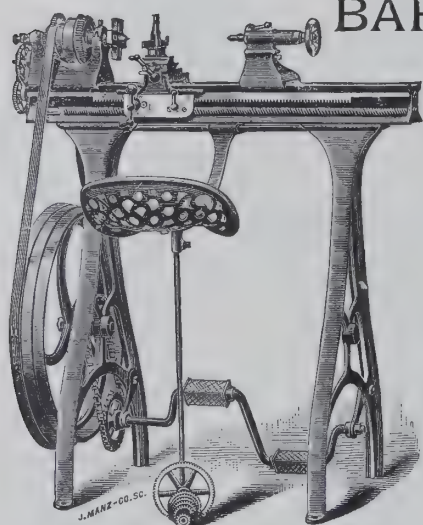
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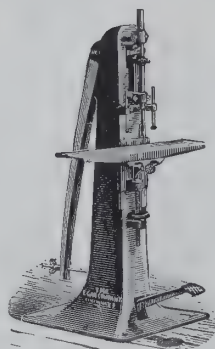
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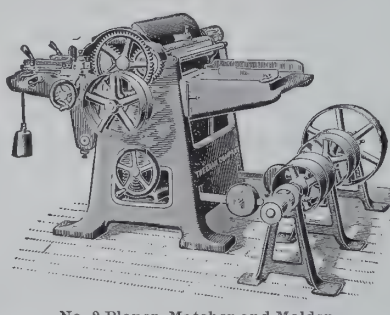
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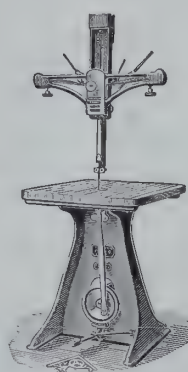
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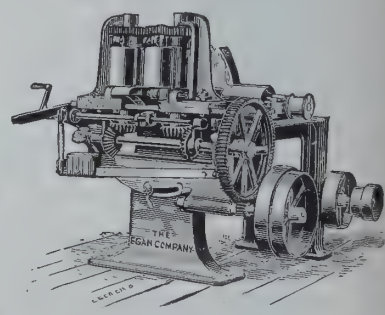
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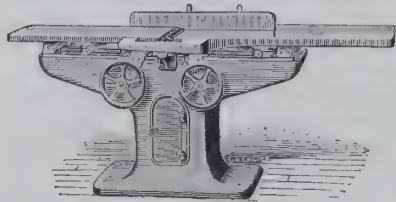
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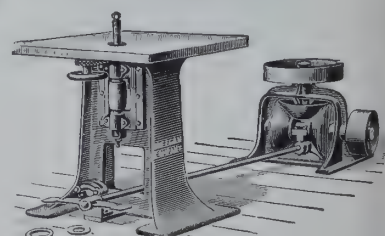
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## AN ENGLISHMAN ON AMERICAN RAILWAYS.

IN the London *Times* of February 9th. Mr. W. M. Acworth, the English authority on railway affairs, gives his impressions of a recent visit to America.

"The railways of the United States have two points of interest for the English public. In the first place, we have invested in them—not always wisely—enormous sums of money.

"Further, in everything that makes railway travelling safe, rapid and convenient, America is the only country which can seriously dispute our English primacy. While, for example, English signalling methods and appliances have set the standard for the world, it is to America that we owe automatic brakes and sleeping and dining cars. Within the last few years, moreover, there can be no doubt that American railways have improved more rapidly than their English rivals. Ten years ago a comparison between English and American express speeds would have been out of the question. But to day, while the quantity of our fast and very fast trains is still quite unmatched in the States, it must be confessed that the quality of the very fastest American trains is such as we cannot pretend to equal. Perhaps, therefore, a writer who has had, owing to the kindness of American friends, exceptional opportunities of seeing what is being done and hearing what is projected or expected, not, indeed, on the railways of the United States as a whole, but on the important portion of them lying between Boston, Washington, St. Louis and Chicago, may be allowed to attempt an outline sketch of the present American railway situation as compared and contrasted with that with which we are familiar at home.

"As money is only invested in railway construction in order that trains may run, and as interest and dividends can only be paid out of train earnings, it seems logical to begin with what is called in the States 'operation'—the word might with advantage be adopted here in place of the much less definite phrase 'working.' Further, among operation questions, speed, which of necessity implies a certain standard of efficiency both of organization and machinery, seems with equal naturalness to come first. So we will begin with speed. As I have already said, there are, speaking generally, fewer first-class expresses, unless it be between New York and Philadelphia (90 miles), than we are accustomed to here, and not a few trains are called express which only run at some 35 or 38 miles an hour. But the best expresses are very good. Between New York and Washington, for instance, the Royal Blue Line does 228 miles in 5 hours, including the steamboat transit across New York harbor. So, too, the New Haven railroad covers the 232 miles between New York and Boston in 5 hours. With these two performances may fairly be compared Paddington to Torquay, 220 miles, in 4 hours 55 minutes; St. Pancras to Hellifield, 231½ miles, in 4 hours 58 minutes; King's Cross to Darlington, 232¼ miles, in 4 hours 44 minutes; Carlisle to Aberdeen, 240 miles, in 4 hours 58 minutes. Thus far England holds its own. But there are three trains in America against which none that we have here can be fairly matched. Most wonderful of all is the Atlantic City Express of the Reading Company, which ran last summer during the holiday season from Philadelphia to Atlantic City, on the New Jersey coast. The distance is 56½ miles, including a mile of steamboat ferry across the Delaware River to Camden, whence the train starts. The time allowed was one hour exactly, out of which eight minutes were allotted to the ferry, leaving 52 for the rail journey. In fact, eight minutes proved too short, the train never got away to time, and some days it was almost four minutes late of leaving. Yet, in the whole two months that it ran the train arrived punctual once, and before time on the remaining 51 occasions. The fastest time for the 55½ miles was 46¾ minutes, equal to 71.2 miles an hour; the slowest 50 minutes, equal to 66.6 miles per hour; the average time was 47 minutes 52½ seconds, equal to, say, 69½ miles an hour.

"The Empire State Express of the New York Central, which gets its name from the fact that its entire journey is performed within the limits of New York, the 'Empire' State, runs the 440 miles from New York to Buffalo in 8¼ hours. There are four intermediate stops. The weight of the train is 175 tons, which is roughly equal to 11 of our East Coast Joint Stock six-wheelers. The

East Coast best train to Perth, 1½ miles further from King's Cross than Buffalo is from New York, takes 9 hours all but one minute, while the West Coast takes 21 minutes longer again over its 8½ miles longer route. In the matter of gradients it should be said that the American line has probably some slight advantage, though there is a long climb for nine miles out of Albany, starting on a gradient of 1 in 56, which is much worse than anything which the East Coast companies have to deal with. But I confess to thinking that the difference of gradients, such as it is, would make practically no difference if the American engines were set to haul the English trains. The American locomotives are so enormously powerful that moderate gradients produce no apparent slackening of speed. An American superintendent expects his engines to be able not only to keep, but to make up, time however fast they may be booked. To give one instance, the Empire State train is allowed 80 minutes for the 68½ miles from Rochester to Buffalo, the last three miles of which are through the streets of Buffalo itself. The day I travelled by it we left Rochester six minutes late, and in spite of a bad check bringing us down to walking pace at a point where the line was being slewed over, we drew up at Buffalo station two minutes before time.

"On this run I had a good opportunity of satisfying myself that American engines, whether the cause be their more flexible frames, their equalizing lever, or possibly even the more elastic permanent way, do indubitably 'ride' more smoothly than our English locomotives. From notes jotted down in the 'cab,' which I can now read as I then wrote them, without any difficulty, I see that for 21 consecutive miles our speed ranged between 70 and 80 miles an hour; for the whole 21 miles our time was 16¾ minutes, or an average of about 75¼ miles an hour. Good as this was, I think the previous run of the same engine, Syracuse to Rochester, 80½ miles, in 80 minutes start to stop, was even more remarkable.

"I returned from Buffalo to New York by another famous train, the 'Black Diamond' Express of the Lehigh Valley Company, one of the so-called 'coaler' roads, which serves the anthracite regions of Pennsylvania. It was rather a shock to my English ideas to be presented by the conductor to the driver as 'a man who has got leave to come on your engine.' But the genial reception of the 'engineer,' who, pulling off his gloves, shook me warmly by the hand and gave me his visiting card, at once consoled me. In this case the time allowed was 9 hours 38 minutes, but the distance is 71½ miles further than by the New York Central. There are 11 intermediate stops, as against 4, and the line, instead of following the level valleys of the Hudson and the Mohawk, has to climb over three summits of 924, 1,141 and 1,759 feet respectively. The weight of the train was 165 tons, except for about 100 miles, during which the addition of an extra Pullman car brought it well over 200 tons. We were five minutes late in starting, and before we had gone very far we were stopped by an axle-box on the Pullman car heating. The natural result was that we reached Geneva, about 100 miles from Buffalo, 12 minutes late. Thence to Sayre, 73½ miles, we were timed to take 86 minutes, but we covered the distance in 74, and so came in exactly to time. I had timed 20 miles in different places done at speeds of from 72 to 80 miles an hour. But our misfortunes were not yet at an end. Soon after leaving Sayre we were brought up short by a broken-down freight train, two of whose cars had got off the track and blocked both lines. Evidently American railway men are experts in dealing with 'wrecks.' It was most interesting to see how quickly a rope was brought, one end of it fastened to the wrecked cars, then the other end run through a snatch-block, made fast to a conveniently adjacent tree, and thence carried to the locomotive. A gentle pull by the engine and the cars fell over on their sides into a ditch, and our road was clear again; but we were 33 minutes late at our next stopping place. Then we set to work again to recover our lost ground, till, finally, we reached Jersey City only 15 minutes late. We had come in the last 77 miles from Easton in 79 minutes, as against 90 minutes allowed in the time book, and we had stopped at two important intermediate stations. Swindon to Paddington is also 77 miles, and an even more level road. But the Great Western trains—and no line in this country runs finer expresses—are allowed 87 minutes for the through run to Paddington, and never less than 110 minutes if they have to call at Didcot and Reading. The real comparison, however, to the 'Black Diamond' should be made with the best Midland express to Perth. Like the Midland, the Lehigh Valley has heavier gradients than its rivals; like the Midland it runs through a district congested with heavy coal and iron traffic; but, unlike the Midland, it has a long stretch of single line. The Midland's distance is 71½ miles further, and there are 17 intermediate stops, as against 11. A handsome allowance for the extra miles and the extra stops would be 45 minutes; but the extra time allowed by the Midland is, in fact, over 2 hours.

"Admirable as these American trains are on paper, they are yet more



admirable in practice from the fact that they run with almost absolute punctuality. Few English railway men will be found to deny that punctuality is the weak point in our service. Everywhere in America I found that, whether by officials, train staff or by the travelling public, punctuality is taken for granted. And, if I may judge by my own experience after travelling some 6,000 miles, it is so taken with good right. We are told that punctuality in England is more difficult of attainment owing to the crowded condition of our English main lines. With all respect I think the facts are the other way, and that on the whole the attainment of punctuality is a greater feat in America than it would be here. Granted that our main lines have more trains on them than the great American roads, I am sure they have not more traffic. The Midland, for instance, probably brings, on an average, 10,000 tons of coal a day up to London. Under English methods this implies at least twenty-five trains. The Pennsylvania or New York Central would haul the same load in six or seven trains. On the Pennsylvania, for instance, I counted the cars—not our little trucks, but 30-ton cars—on three trains which we passed in succession, each hauled by one engine. The first train had 70 loaded cars, the second 67, while the third had 91 empties. Yet I was told that in order still further to concentrate their traffic into few units, the Pennsylvania had determined to advance from 30-ton to 50-ton cars. Our English railways have therefore the natural remedy for congestion of trains to a considerable extent in their own hands.

"And then it must be remembered that in America the lines are almost always single. In fact, though the States have 180,000 miles of railway to our 21,000, we have actually more miles of double line than they have. Of course, the great trunk lines into New York are double, or even in two or three instances quadruple, but the trunk line is always fed by single lines, hundreds, or, it may be, thousands of miles in length. Take as a typical instance the run of the Pennsylvania 'Limited' between New York and Chicago. On its direct route there are nearly 150 miles of single line, and besides that, at Pittsburg, the east-bound train picks up cars from St. Louis and Cincinnati which have travelled over hundreds of miles of single line in order to make the connection.

"Even more important than single line are the stops and slacks. A train shown in 'Bradshaw' as running without a stop, say, from London to Crewe, does, in fact, run the whole distance at full speed. Between New York and Albany (143 miles), on the Empire State Express, there is no booked stop, but we slack down eight times, and this is a fair sample of what American engines have to contend with. When railways run, as American lines mostly do, across and even along the principal streets of important towns, full speed is, even to the American mind, out of the question. Or take another illustration. The best expresses of the New Haven road, one of the most go-ahead lines in the country, are allowed one and one half hours for the 73 miles between New York and New Haven. Having seen with what consummate ease this was accomplished, I said to the president: 'Why do you not quicken your timing?' The answer was convincing: 'Because there are six drawbridges en route, any or all of which may be open against the train, so that we are bound to leave a good margin.' Yet another American disadvantage. To say that their expresses are on the average 50 per cent. heavier than ours would be, I believe, to understate the facts. Probably the heaviest express in this country is the 2 P. M. corridor train from Euston to Scotland. It weighs, I believe, about on the average, 270 tons. For combination of speed and weight I know no American train that can match it. But this train is exceptional, and very frequently has two engines—a thing unknown in America. Certainly, except perhaps on the Northwestern, our average express cannot be said to weigh more than from 120 to 150, or, at the outside, 200 tons. In America 270 tons is still a light train. The Pennsylvania Limited weighs fully 350. I travelled in one or two trains and I saw many more which certainly weighed 400 tons and upward. I have, for instance, a record of four runs with trains averaging over 500 tons each, the speed being 50 miles an hour from start to stop. Now, 500 tons in England would mean an ordinary coal train.

"On the whole, then, I believe it is true to say, not only that American trains are punctual, but that they are punctual in spite of difficulties even greater than those our railways have to contend with."

### Shipbuilding in New York.

ANDREW CARNEGIE has addressed a letter to the *Iron Trade Review*, of Cleveland, calling attention to the field which is open for a first-class shipbuilding yard upon the Hudson, East River, or lower bay, near New York. He says: "The prices paid for steel by British and German shipyards are so much higher than shipbuilders in New York would be required to pay that the difference would make, in itself, an excellent profit. Plates are worth about

\$22 or \$23 per ton in New York. The quoted price at Glasgow is nearly \$30. Other prices are in proportion, and all the woodwork of ships is also much cheaper with us. If a yard were built to-day with the newest appliances, the total cost of labor, even at much higher wages, would be less than in any shipyard I know of, either in Britain or Germany. I name near New York as the best for several reasons: 1. A shipyard there would get repair work, which is always profitable. 2. A drydock could be part of the equipment, which would also be highly profitable. 3. Two years hence the cost of transport upon steel delivered at the shipyard at New York from Pittsburg, the cheapest market for steel in the world, will not exceed \$1 per ton, via Conneaut and the deepened Erie Canal. Indeed, it will be less, since it will cost nothing to send steel to Conneaut in cars which otherwise must return to the Lake empty for ore. The present seaboard shipyards are so usefully occupied with domestic business that they cannot give foreign business proper attention. The New York yard should be constructed on a larger scale and with special reference to the foreign demand.

"I am satisfied that the United States can readily regain the supremacy in shipbuilding it had when wooden ships were in vogue. It only needs an enterprising Western shipbuilding concern to establish a yard near New York and manage it with the skill and energy which have characterized those on the Lakes. This is the only prominent department of manufacturing in which our country is behind, and it is one in which it easily can obtain front rank. It would justify steel manufacturers to guarantee to such a shipbuilding concern a continuance of the present extremely low rates upon steel for a term of years, and also that steel of all kinds and armor and guns should always be furnished at the lowest price paid by European shipbuilders. But there is nothing to fear from the prices of steel, for these henceforth are to rule lower in our country than in any country of Europe. It will not be long before a large portion of its steel supply must be drawn by Europe from the United States.

"If I were a younger man, or rather, if I did not belong to a concern so enterprising as to employ all my capital and give me a pleasurable occupation watching over its progress and success, I should be greatly inclined to enter upon the building of ships somewhere near New York harbor. There would be no warships or Atlantic liners open for bids in any part of the world which the New York yard would not have something to say about. Every needed element is present for regaining our supremacy as the principal shipbuilding country. Surely some one of the successful Lake concerns will consider the advisability of establishing a branch yard near New York—a branch which I predict would very soon grow to many times the capacity of the original works, and give a much higher return upon capital, besides rendering its originator famous."

### Foreign Competition in England.

THE question of foreign competition as affecting the United Kingdom was dwelt upon by Sir J. Wolfe Barry, the president of the Institution of Civil Engineers, in distributing the prizes at a London trades training school recently, remarks *Bradstreet's*. He said that instead of the rails for many of the Indian railways being supplied from Great Britain, as they had previously been ever since railways were constructed, they were now coming from America. In spite of the enormous distance these rails were carried, they were being delivered in India at lower prices than British manufacturers could touch. Again, he knew perfectly well that in London an enormous amount of machinery was now being brought from America at lower prices than English manufacturers could quote. Locomotives which also used to be supplied by Great Britain, not only for India but for the colonies and foreign countries, were likewise being sent out from foreign workshops. Touching on the disputes between capital and labor, he argued for a more accurate view of the former, which he said was too often regarded as consisting of money alone, whereas it represented the power of direction and the ability to study the markets of the world and to know what could be sold and what could not.

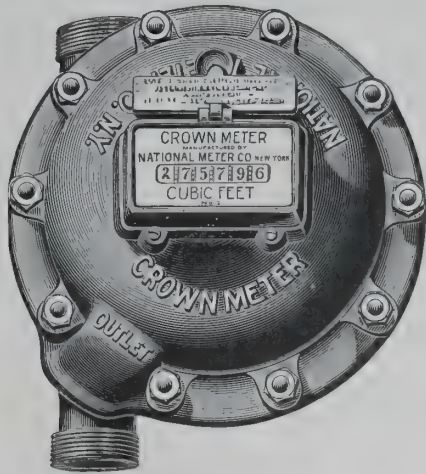
The English iron trade has been considerably stirred by an article in the *Statist* pointing out that the exports and home consumption of iron have exceeded the whole output of the United Kingdom by nearly 500,000 tons, and predicting a pig-iron famine before the end of the year. The *Statist* concludes: "There is quite a large probability that we may have to fall back upon America at no distant future to make good our deficient supply—on America, once our largest buyer of both pigs and finished material."

—Following the shipment of fifteen locomotives, to be used on the Egyptian Government railroad, more than 50,000 tons of railway material have been ordered to be shipped during the summer.



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[APRIL, 1898]

City of Highland Park, Illinois.

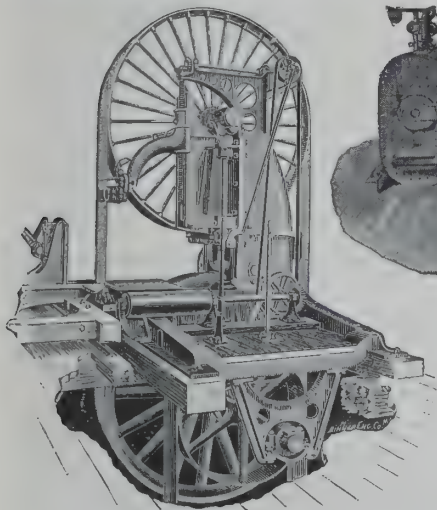
NATIONAL METER CO.,  
298 Broadway, New York.

GENTLEMEN:

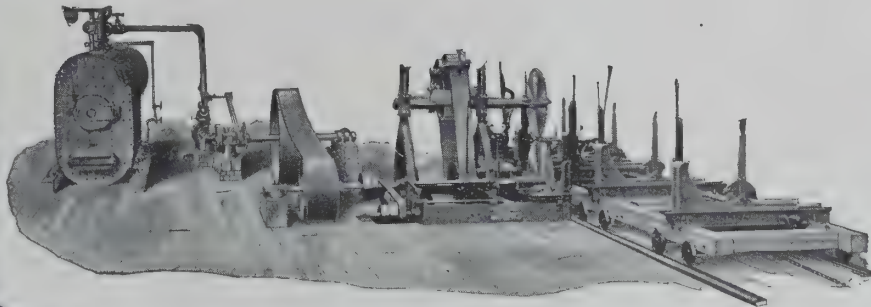
Replying to your favor of the 3d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

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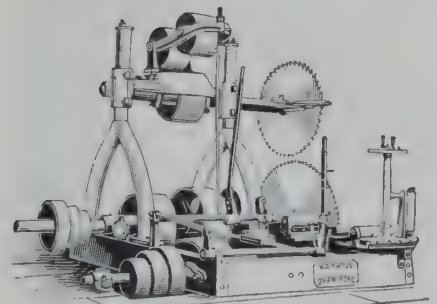
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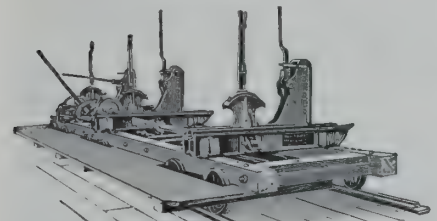
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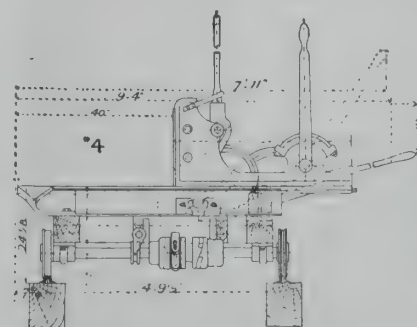
AUTOMATIC CUTTING-OFF SAW—2 men with this machine cut 60 cords of pulp wood 16 to 24 inches long, or 100 cords 48 inches long in 10 hours, taking logs from water and delivering cut wood to conveyor.



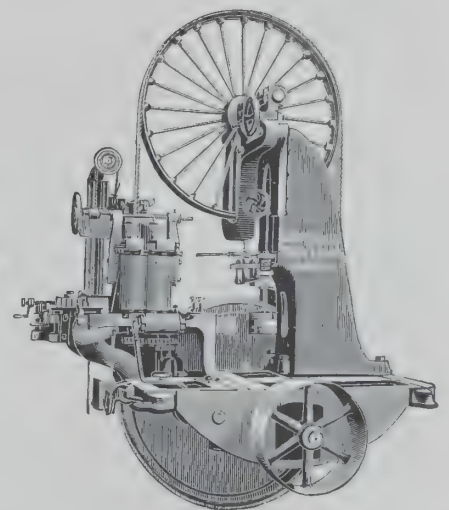
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## Production of Bessemer Steel in America and England.

STATISTICS regarding the production of Bessemer steel ingots and rails in the United States in 1897, presented in the most recent bulletin of the Iron and Steel Association, show that all previous records achieved in this industry have been broken. The increase over last year's production exceeds 39 per cent. The total production of Bessemer steel ingots in 1897 was 5,475,315 gross tons—an increase of 1,555,409 tons over that of 1896.

The statistics of the production of Bessemer steel ingots in 1897 in Great Britain were considerably greater than in 1896, and than ever before, in spite of the prolonged strike in the engineering trades. Until the year 1880 the annual output of England exceeded that of the United States. In that year we caught up with Great Britain, but in the following year we fell behind in the race and remained in second place for several successive years. In 1889 the United States produced 2,930,204 gross tons and Great Britain 2,140,791 gross tons of Bessemer steel ingots. From that time on we have maintained first place, and each year, with but few exceptions, we have increased our lead, as the following table of annual outputs in tons will show :

	United States.	Great Britain.
1890.....	3,688,871	2,014,843
1891.....	3,247,417	1,642,005
1892.....	4,168,435	1,500,810
1893.....	3,215,686	1,493,454
1894.....	3,571,313	1,535,384
1895.....	4,909,128	1,530,225
1896.....	3,919,906	1,816,842
1897.....	5,475,315	2,141,791

These figures are very significant. They show a rising tendency in production in this country, while Great Britain remains comparatively stationary.

The increase in production in 1897 over that of 1896 exceeds in gross tons the entire production of Great Britain in any year from 1890 to 1896 and nearly equals the output in the latter year.

If we now turn to the manufacture of steel rails we find an equally surprising exhibit, as follows:

	United States.	Great Britain.
1890.....	1,867,837	1,019,606
1891.....	1,293,053	662,676
1892.....	1,537,588	535,836
1893.....	1,219,400	579,386
1894.....	1,016,013	598,530
1895.....	1,299,628	604,353
1896.....	1,116,958	817,476
1897.....	1,614,399	943,083

The construction of new railroads has been steadily declining in this country since 1887, when it reached 12,984 miles. Since 1894 the annual increase has been less than 2,000 miles; yet we note an increase of more than half a million tons in the production of steel rails in 1897 over that of the previous year. What do these figures indicate? They are fingers all pointing toward foreign lands. We have not only begun to export steel rails and other products of iron and steel, but we have already become such large exporters of these commodities that production has been greatly stimulated.

In 1896 our exports of iron and steel amounted in value to \$48,709,134; in 1897 to \$62,762,299. Our imports of iron and steel in 1897 to \$14,514,862. Thus it appears that the excess of exports over imports of iron and steel in 1897 amounted in value to \$48,247,437 as compared with \$28,165,640 in 1896. The gain in exports is nearly 30 per cent. in one year, and the decline in imports is about the same.

Our exports of pig iron increased from 62,071 tons in 1896 to 262,686 tons in 1897, and of steel rails from 73,121 tons in 1896 to 148,190 tons in 1897. During the same period the importation of steel rails declined from 7,796 tons to 415 tons, thus practically ceasing altogether.

## Rights of Inventors.

THE full report of the conference of the Union for the Protection of Industrial Property, which met at Brussels in December last, has been received from the delegates representing the United States, and is of marked interest. There were present at the conference not only delegates from fifteen of the States of the Union, but also from seven countries which have not yet adhered to it, among which are Germany and Japan.

The proposition for amendment of the convention, submitted by the United States, looking toward reciprocity in the matter of fees and the requirements of working, and the matter of inventions belonging to certain classes, which are patentable in the United States, but not in certain other countries,

were held by the conference to be contrary to the general spirit of the convention, but several solutions of the difficulties complained of were suggested which would not be obnoxious to it.

A proposition to so amend the convention that patents granted in the several countries shall be mutually independent, that is, that a patent granted for fourteen years in one country shall not shorten the term of a patent subsequently granted in a country in which the normal term is seventeen or twenty years, received the support of the United States delegates and was adopted by the conference.

The proposed extension of the "delay of priority" to one year, the proposition that patents worked to the extent required in the country of origin should not be forfeited for non-working in other countries for at least three years from the grant of the patent, and certain propositions relating to trademarks, were discussed very fully, but had to be left to be settled by correspondence.

The United States delegates took an active interest in the discussion of changes proposed in the agreement respecting the international registration of trademarks, though the United States is not at present a party to that agreement. The purpose of this agreement is to make the international bureau at Berne the centre of a cheap registration which shall be efficient over the territory of the adhering states. Such a registration is extremely desirable and is practically a necessity if our manufacturers are to be protected in their foreign trade, as, unless their trademarks are registered by them in each of the countries with which they have or wish to have an extensive trade, they are liable to find their goods stopped at the custom house, or even seized as being an infringement on the rights of some citizen of the country who has knowingly appropriated their trademark and had it registered. This has, in fact, frequently happened, especially in Germany. A United States manufacturing firm, whose trademark is known from one end of the country to the other, recently complained to this office that their trademark had been copied and registered by a German manufacturer, who was able, by virtue of his registration, to stop their trade in that country. The same thing is said to have happened to an English manufacturer, whose trademark is known all over the world, who had, however, failed to register it himself in Germany.

The fee for this international registration was reduced to 100 francs for the first mark and 50 francs for each of all other marks for registration at the same time by the same owner.

Annexed to the report are a number of papers of great interest. Among these is a statement made by the German delegates in which they urge the extension of the delay of priority to one year, instead of seven months, and abolition of forfeiture of patents for non-working. They seem to make amendment as to these two points the condition of their adhesion to the convention. Both of these are favored by the United States delegates as being in the interest of our inventors.

Among the other papers is a statement of the inventions excluded from protection in a number of foreign countries, and a statement of the requirements as to working the invention made in certain countries. In some countries the failure to manufacture the invention in the country within one year invalidates a patent granted on that invention. In others two years, or even three years, are allowed, and importation of goods made under the patent is prohibited. This means that the manufacturer of an invention must establish factories in each of these countries or give up patent protection in those countries, and is a very onerous requirement.

On the whole, the conference was a most important one and marks a long step forward toward a complete agreement between the nations as to patent and trademark protection. The conference adjourned with the understanding that the delegates are to be called together by the Belgian Government at an early date, probably in June, for the further discussion and settlement of certain questions as to which some of the delegates did not have power to act. The next conference will be held in Washington, at such time as the United States may determine. We shall endeavor to acquaint our readers with the results of future deliberations of this conference, as the subjects discussed are of interest to all buyers as well as inventors and manufacturers of machinery.

**Nut-Making Machinery.**—Remarkable advancement has been made in the perfection of machinery for the manufacture of nuts. An Ohio firm has recently completed a machine which produces a complete nut with two movements of the operator, the machinery used heretofore requiring four movements. It is said a boy that can handle the bar of iron and do the feeding can make a ton of nuts in a day. The machine has just been completed and put in operation. It is expected it will revolutionize the manufacture of nuts. Large orders from these works have been sent to Leeds, Manchester and other points in England.





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Gentlemen—I have great pleasure in recommending Woolsey's Copper Best Paint. I have used it on my Company's steamers for a number of years past, and it has given entire satisfaction. The Devonport Ferry Company's steamers "Britannia," "Victoria," "Alexandra," "Takapuna" and "Tainui" are now coated with Woolsey's Copper Paint over Metal Sheeting.

Faithfully yours,

ALEX. ALISON, Manager.

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Our Kalsomine is made of the best selected material and the tints and colors are particularly brilliant and clear. We are selling large quantities in the foreign markets with gratifying results. Send a sample order. You can make no mistake, for it is the best Kalsomine in the market.

### COACH

—AND—

### CAR COLORS.

GROUND IN JAPAN.

TESTIMONIAL.

CHARLOTTE, MICH.,  
March 17, 1890,

C. A. WOOLSEY,  
Dear Sir:—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Greens are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

Yours truly,

MAY & BARNEY.

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LEADS THEM ALL,

So our Testimonials Say.

We guarantee this Copper Paint to be the easiest to apply and, owing to its being so finely ground, it is the smoothest paint in the market.

Highest Medals from American Institute, New York City.

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For Yachts. Brightest Color Made.

NEW JERSEY SEAM PAINT,

A Perfect Substitute for Pitch.

NEW JERSEY PAINT WORKS,

HARRY LOUDERBOUGH, Proprietor,

JERSEY CITY, N. J.

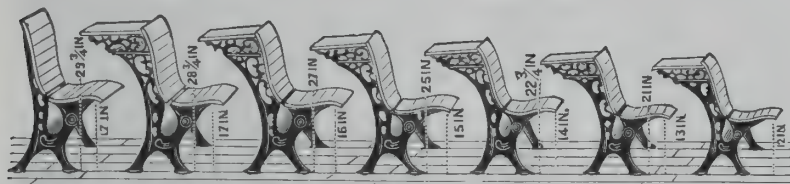
U. S. A.

REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.

MILLS EDWARD Master Schooner "Florence Shay."



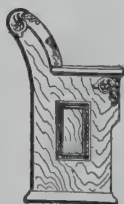
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## AUTOMATIC MACHINERY THE SECRET OF CHEAP PRODUCTION.

AT the beginning of the last century the relative cost of the necessities and luxuries of life was many times greater than now. Mechanical appliances were of the crudest nature, rapid production was impossible, and wages were low. In the absence of machinery everything had to be made by hand; production was slow and painful, and the hours of labor long. Indeed, it may be truthfully said that at that time man lived by the sweat of his brow. The working classes, which in the very nature of things must always be in the majority, had to content themselves with the bare necessities of existence. Their food and clothing were of the cheapest and crudest nature. Their dwellings were mere hovels, without light or comfort. As so much labor was represented in the cost of production, only very low wages could be paid, and the cost of manufactured articles was so great that the working classes could not be considered purchasers. As a consequence, the purchasing class was extremely limited, being confined to the comparatively rich.

Suppose that a clever mechanic, with no implements or materials other than those which could be obtained at that time, should have attempted to make a bicycle. First it would have been necessary to forge the various parts by hand out of steel. Then, by an extremely slow and laborious process, the tubes must have been bored and turned by hand. The cranks, the chain, the sprocket wheels, the spokes, and all the numerous nuts and screws would also have had to have been made by hand. Certainly from six months to a year of labor would have been represented in a single bicycle. Evidently the sale of such bicycles would have been extremely limited. At the present day a workman can produce at least 100 bicycles in the time that would have been necessary to the production of one at the beginning of the last century. And what is true of bicycles is true of every other manufactured article. With this great diminution in labor and amazing increase in output, it has been possible to vastly increase the pay of the workingman, so that not only has the cost of the product itself been greatly reduced, but the higher wages paid to the working classes has converted them into a purchasing class, which has increased a thousand-fold the sale of the luxuries of life. Had no improved machinery been introduced, wages would still be extremely low, and the working classes would not be able to enjoy any of the luxuries so common to that class at the present moment.

Two hundred years ago the workingman had to be content with a stone or mud floor. To day it may be said with truth that the workingmen in America purchase more square miles of carpet in a year than was sold in the whole of Europe during the seventeenth century.

When books were written or engrossed by hand, the amount of labor represented in each book was evidently very great; consequently, they were so expensive and rare as to be practically unknown to the great majority of mankind. To day, thanks to the improved automatic machinery employed, books can be made with great rapidity and cheapness. The result is that the workingman himself has become a large purchaser.

Suppose any one were to make Winchester rifles by hand; they would cost at least £60 each, and none but an extremely skillful man would be able to make them. The production would be small and the sale very limited, being confined to the comparatively rich. At the present moment, however, by the use of greatly improved automatic machinery, unskilled workmen and boys are able to produce these rifles with great rapidity and cheapness. Instead of costing £60 each, the actual cost of their production is probably about £1 4s. each, and they can be purchased at retail at, say, £3 each. As the sale is not confined to any particular class, it is, as a consequence, very extensive, these rifles being purchased in large numbers throughout the whole world. Without machinery, the rifles would cost £60 each, and would have to be sold for at least £100 each, and perhaps twenty skilled mechanics might supply the demand; but to-day, hundreds of skilled mechanics are employed in tool, gauge and machine making, in order to keep employed some thousands of relatively unskilled mechanics.

A watch in the last century represented a great amount of labor. The market was small, and very few were made, but to-day watches are largely made by automatic machinery, and the cost in labor has been so reduced that their use is not confined to the rich. The working classes, who in the first instance were not purchasers at all, have become by far the largest purchasers, thereby creating a new demand, enabling thousands to be employed in watchmaking where only hundreds were employed before.

From the foregoing it will be seen that the great change which has come over the manufacturing industries during the last 150 years is due altogether to the improvements in machinery and mechanical appliances. It will also be seen that by the cheapening of production, especially through the decrease of labor required for any particular article, the manufacturer has been able to pay to the

working class a much larger wage, and this, together with the cheapening of the product, has converted the working class itself into the most important purchasing class that we have in the market to-day. The whole trend of Western civilization is in the direction of rapid and cheap production. Every one whose eyes are not blinded by trade union fallacies must see that the greater the production and the less labor represented in the article, the greater the market must inevitably be; production and the market react upon each other.

The artisan classes may roughly be divided into two categories:

First, those who, from their natural ability and surrounding circumstances, have become skillful in the art—men who, say, in metal working, are able to do the finer kinds of work, such as accurate turning, milling, tool and gauge making, and, in some cases, designing of new machines or new methods of production. These men receive relatively high pay in all countries, and, by their skill, are able to make tools and machinery and to keep them in order, so that work may be turned out with accuracy and great rapidity.

The second category, which includes about nine-tenths of the whole, consists of the unskilled workers—men who for the most part are not sufficiently clever to become, or who have not had an opportunity of becoming, skillful mechanics. These men are not able to make, design or keep in order new machinery or appliances, but, when the machinery is once made, they are able to turn out accurate work, and one of them can easily take charge of from four to six machines. It is the employment of this class of men at their relatively low rate of pay which enables manufacturers to turn out cheap and accurate work. But it must not be supposed for a moment that the actual pay received by these men—these unskilled workers—is not sufficient to enable them to live in comfort. If a man is intelligent, he may in time become skillful in the use of the machines in his charge, and, if he is very active and works at piece rates, he may earn as much as a skilled mechanic.

An unskilled mechanic is as much a citizen of the country in which he lives as any one else, and is entitled to the same degree of protection and consideration as is accorded to the skilled mechanic. The skilled mechanic has no right whatsoever to create any artificial system which will restrict the liberty or the facilities of the employer to employ this important class of the community.

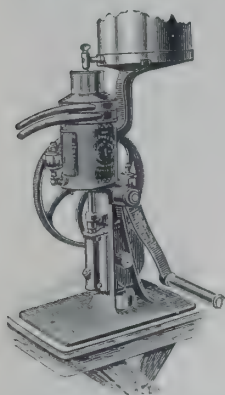
In the United States, especially in the New England States, very high salaries are paid to really skillful, able and active mechanics. As a rule, there is no such thing as a fixed wage, each man being paid in proportion to his skill and his application to business, and every encouragement being given to inventive genius. Any man who can cheapen a process by the designing of new tools or the improving of old ones is considered of great value to the manufacturer, and is paid in a degree corresponding to the benefits derived from his ability. In New England, among the higher class of mechanics, it is not so much a question of the production of articles which are actually made to sell as a question of improvement in the machinery which will enable the unskilled worker to produce these articles with great rapidity. The New England manufacturer is alive to the fact that his success depends upon rapidity and consequent cheapness of production, and that this cheapness can be brought about only by the use of automatic machinery which will enable him to employ unskilled labor. He finds it to his interest to pay the skilled mechanic who assists him wages which would be considered very high in any other part of the world. By this system the New England manufacturer, who may pay a skilled mechanic \$5 a day, is able to place in the European market many articles of manufacture at prices much below those which prevail in Europe.

All the mechanical and agricultural implements employed in the East and South of Europe are of the roughest and crudest description. When Horace Greeley was travelling in France he saw an agriculturist cutting his grass with a sickle. He said: "Don't you know, my man, that with a scythe you could cut twice as much grass?" The Frenchman looked thoughtful for a moment and replied with great deliberation: "I don't see how that can be possible, because I have not twice as much grass to cut." Where the field of employment is extremely limited, as in this case, there may appear to be some excuse for conservatism, but the manufacturer of to-day cannot afford to be conservative. He finds that many others are already in the world-wide field with the most approved appliances, and, unless he arms himself with the very best instruments that modern civilization can furnish and has complete and unrestricted direction of the men who use these instruments, he will be left far behind in the race.—Hiram S. Maxim in *The Engineering Magazine*.

**He Was Too Inventive.**—A Maine inventor some years ago invented a machine simplifying the manufacture of shoes. A New England company purchased his invention for \$100,000 cash and gave him \$2 500 per year for life, provided he would do no more inventing. In a recent interview he bitterly regrets having made that contract.



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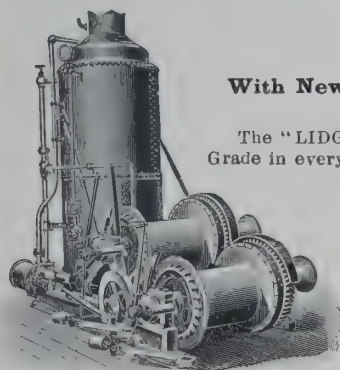
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Warerooms: 96 Liberty Street, NEW YORK, U. S. A.

# Pierce Well Engineering & Supply Co.

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Cable Address, "Artesianos, New York."

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**WATER, OIL & GAS.**

Any depth from 25 to 5,000 feet.

Also, Special Tools for Soundings and Test Borings for Water and Mineral Prospecting and Developing

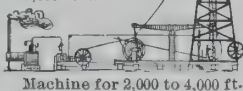
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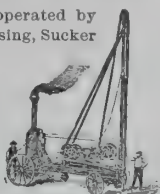
Complete Machines and Experienced Men sent to any Country or Clime. We have the largest and most varied experience of any firm in this business in America.

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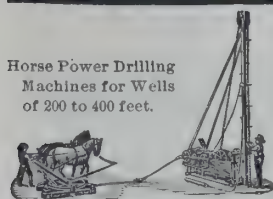
When writing, always state fully what is desired, giving greatest depth of borings required, if in Earth or Rock, and if for Water, Oil, Gas or Minerals.



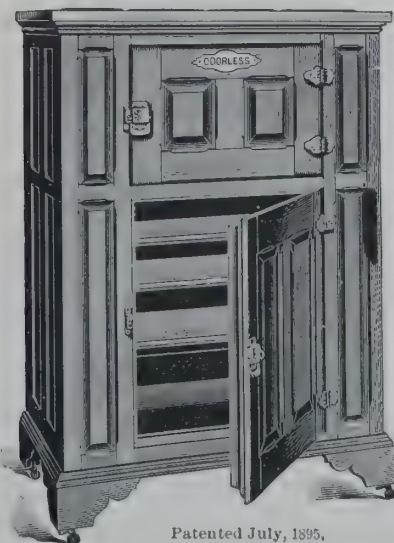
Machine for 2,000 to 4,000 ft.



Steam Rigs for 200, 350, 600 and 1,000 ft.



Horse Power Drilling Machines for Wells of 200 to 400 feet.



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A Scientific Preserver of Food.

The air circulation is so perfect that One Dish Won't Taste of Another.

A GREAT ICE-SAVER.

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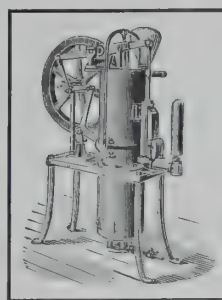
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ESTABLISHED 1861.

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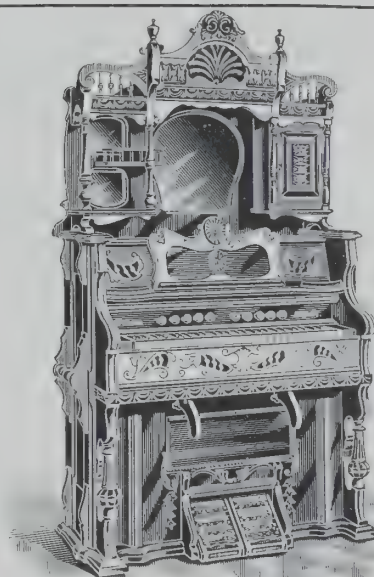
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# LAMBERT HOISTING ENGINE CO.

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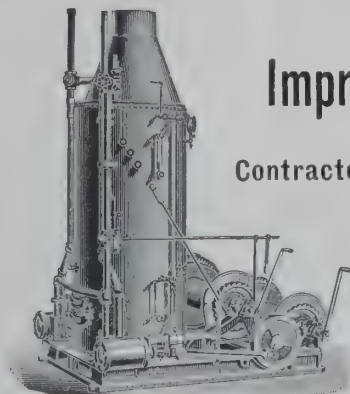
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Correspondence solicited.



### Export Notes.

—Fay & Scott, Dexter, Me., have just shipped one of their largest lathes to Paris.

—The Erie City Iron Works, Erie, Pa., has just shipped six large engines to Marseilles, France.

—The Truax Ore Car Manufacturing Company, Denver, Col., has shipped the second consignment of 20 cars to Aguas Calientes, Mexico.

—The Imperial Government railways of Japan have placed an order with the Carnegie Steel Company, Limited, for 30 miles of 20-pound rails.

—Messrs. Levie Brothers, of Brussels, have just ordered an equipment of Brightman mechanical stokers from the Brightman Furnace Company, Cleveland, O.

—An order has just been placed with the local office of a pipe mill for 5,000 tons of wrought-iron pipe for South Africa. Business from this market has been comparatively active recently, and some very satisfactory orders in the hardware line have been placed.

—Orders for agricultural machinery from the French market have been improving since the beginning of the month, and the shipment of the first week has been the largest in this line for one week in several months past; in mowers and reapers alone it reached \$105,027.

—The Schultz Belting Company, St. Louis, Mo., has recently shipped 18,000 feet of belting to Moscow, Russia, and 1,800 feet to Johannesburg, South Africa. Other recent shipments have been made to Copenhagen, Malmo, Sweden, and London, about 4,000 feet to each.

—D. M. Osborne & Co., of Auburn, N. Y., who recently shipped 27 carloads of machinery and implements to Russia, as reported elsewhere, report an order just received from Roumania that will call for some 600 machines. These machines will fill another train of 27 cars.

—The Pusey & Jones Company, of Wilmington, Del., received not long ago an order for two mammoth paper machines to go to Stockholm, Sweden, the total weight being nearly 1,000,000 pounds. They report also a considerable order from Mexico for paper machinery, a binder's board machine and complete equipment for the same.

—Another Wilmington firm shipped recently five sleeping cars and 27 electric cars, which will go from this port to Buenos Ayres, Argentina. This company has constructed for the South American market during the past year more than 50 passenger cars.

—The Walker Company, of Cleveland, Ohio, has just been awarded a contract for three large direct connecting generators for the Manaos Electric Railway Company, of Manaos, State of Amazonas, Brazil. The same company has recently entered orders for motors for the Glasgow Municipal Tramway, a generator for the electric railway in Alexandria, Egypt, and for the equipment of 100 cars for Dresden.

—It is announced that a contract for 26 steel bridges on the Orange Free State Government railroads has just been awarded to an American firm. Another concern in this country is to build 100 gondola cars for the same roads. The cars will be equipped with entire steel frames and steel-tired wheels. They will also build 15 passenger cars which are to be fitted with 40-inch steel-tired wheels and will be similar to an American passenger coach, only a little smaller.

—The exports of sugar machinery for this month have been the largest on record for some time past. Argentina, Colombia and Salvador have been the markets to which the principal shipments have been made. From records kept, upwards of \$50,000 would cover the shipments. Argentina has taken about two thirds of this amount, and the balance has gone to Hondo and Acajutla. No small cane mills for horse or oxen power are included in these transactions, but they are said to be for large steam sugar plantations.

—The termination of the engineering strike in England is bringing very satisfactory results to this market. Several good-sized orders for large tools have arrived recently, and the majority of these orders are said to be for machine shop tools. Inquiries show that some activity is contemplated in the machinery trade of Great Britain, and, as an agent for a tool house writes "they mean to make up for lost time, and in their endeavor to do so the tool and machinery trade of the United States will doubtless benefit by the demand." The demand from Germany has also shown some activity.

—The *Iron Age* reports that a London concern, desiring to buy a large lot of fine tools, made inquiry of a manufacturer's agent in London and learned that the tools could be bought as cheaply from the United States as from the English makers. Being anxious to fill the whole order as quickly as possible, it was

divided, one-half being given to an English concern and the other half, by cable, to the Standard Tool Company, Cleveland, Ohio. The Cleveland concern, receiving the order on a Monday morning, went to work on the order the same day and completed the work so rapidly that the goods were shipped and reached London just two weeks after the order was given. On the other hand, the English concern worked on their share so deliberately that their goods were not delivered in London until 60 days had passed. The Standard Tool Company are now busy on an order for 9,000 twist drills for one of the shops of the French Government. This order cannot be broken, but the whole number of drills must be shipped at one time.

### Making Gas Engines.

WHEN American manufacturers began to make gas engines they at the start attempted to produce them cheaper and lighter than the Germans and English. They succeeded to such an extent that gas engines met with much disfavor for some years thereafter. However, this has been entirely overcome, but the manufacturers first had to take a step backward. Good high-priced engines were finally made, but they were complicated. It was found that weight was sometimes a desirable feature, and that simplicity must be attained, while sufficient size must be given to the wearing surfaces to insure durability. Reduction in price followed with simplicity, until now American gas engines have reached a stage of comparative perfection.

A gas engine is not a steam engine run by gas, but is one needing no boiler, but into whose cylinder an explosive mixture of gas and air is introduced behind the piston and there compressed and fired. The manufacture of these engines has increased largely since simplicity has been attained. Economy in fuel has also been a study of the manufacturers, and the consumption of gas in a properly made engine has been reduced to 15 cubic feet an hour to the horse power.

The English makers work on somewhat different lines as regards power, making engines up to 300 horse power. In this country most manufacturers limit the size to about 35 horse power, believing that a battery of several engines gives better results than one large engine. This is found true, particularly in capacities into which gas engines are entering largely, that of supplying power for electric-lighting plants.

**Russia After American Railway Supplies.**—Russian manufacturers of steel rails may be forced to call upon Pittsburg for material to finish the great trans Siberian railway. Negotiations are said to be pending between the representatives of several Russian manufacturing plants and local concerns, and their successful consummation will mean the placing of almost \$1,000,000 worth of contracts with American industrial plants. Contracts are to be awarded, it is understood, for a large quantity of steel rails, for delivery at a destination afterwards to be named, together with orders for locomotives of the mogul and smaller types. Specifications have also been submitted to American manufacturers for passenger coaches and freight cars. All are to be fashioned according to plans drawn by the Russian engineers, and are to be specially adapted for use in Siberia.

All possible energy is being used to push along the Siberian railway project. Over 5,000 miles of rails have already been put in position, and it is generally expected that, before the middle of 1904, Russia will have locomotives drawing passenger and freight trains from the shore of the North Sea to that of the Japan Sea. Within the next year, it is hoped, trains will run over the Siberian road to the Amoor River. Thence by fast steamer, passengers, mail and parcels and freight are to be pushed on to Chaborawka; thence, in eighteen hours, over the South Russian section of the Siberian road to Vladivostock, making the distance from London to the most important harbor of the Japan Sea in seventeen days.

**An Australian Opinion of American Cotton Mills.**—The New York correspondent of a morning contemporary writes:—"The English cotton trade, as respects many special lines, has begun to feel more heavily than ever the competition of the great mills of the United States, where the highest skill and the best methods ever attained are to be found. The total American output is increasing at a great rate by reason of the development of cotton mills in the South, where all the conditions of cheap manufacture exist to an exceptional degree. Thus the closing years of the present century and the opening years of the twentieth are to witness a most interesting series of developments in the production and distribution of the world's great staples of industry; and no other country occupies a position nearly so favorable as that of the United States."—*The Storekeeper and Commercial Record, Sydney.*

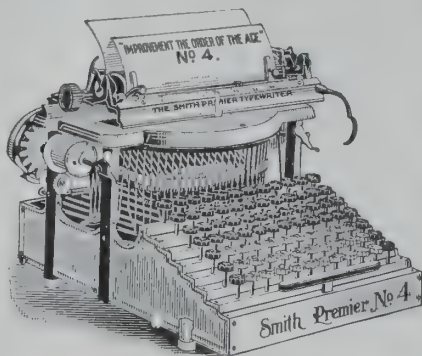


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Ivory finish, highly enameled; used all over the world; sales exceed all other makes.

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All linen; for Clubs.

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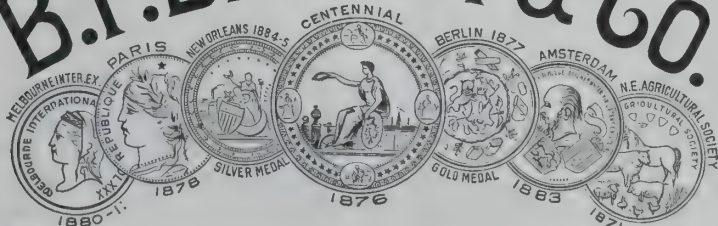
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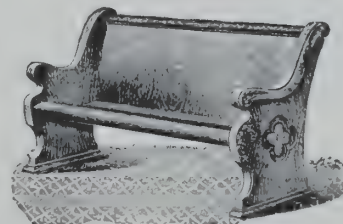


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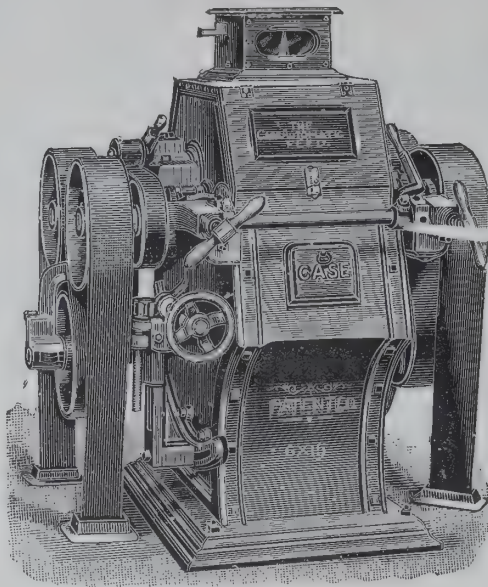
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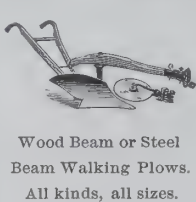
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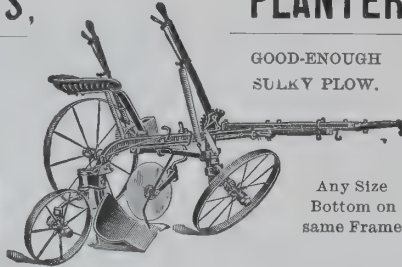
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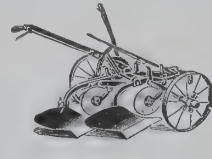


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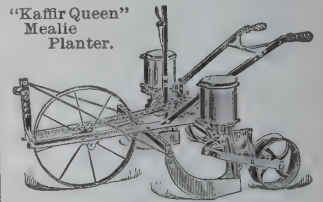


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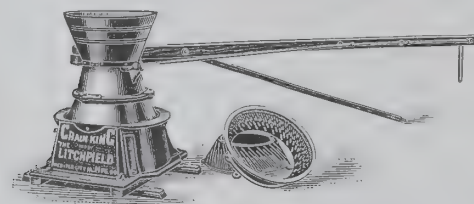
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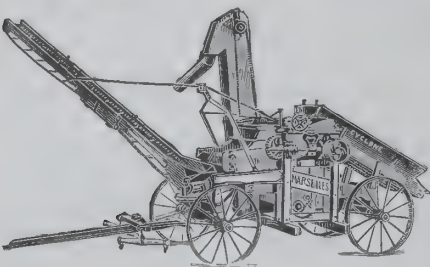


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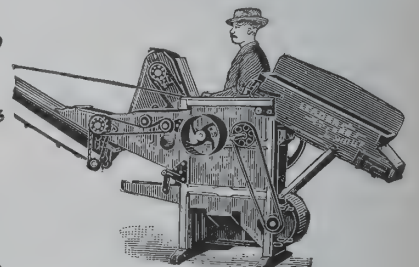


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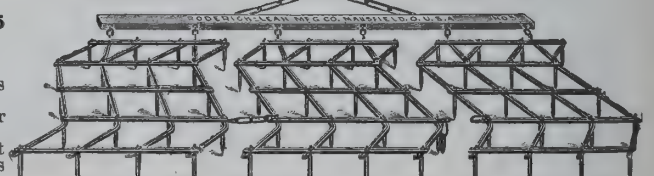
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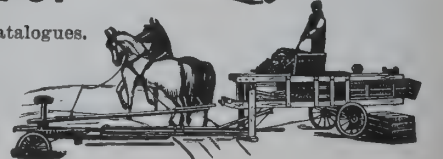
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## AMERICA AND THE RUSSIAN MACHINERY TRADE.

IT is a well known fact that Russia is exerting herself to the utmost in order to develop her iron and steel industry, and that large orders for machinery are placed abroad. Unfortunately the tables published by the Bureau of Statistics do not present the exports to Russia separately, so, to obtain authoritative statistics on this subject we must turn to those published by the Russian Government. From these it appears that the imports of machinery of all kinds are increasing very rapidly. From 1893 to 1896 Russia imported machinery as follows:

1893.....	3 214,755	poods, worth	26,701,623	rubles.
1894.....	5,488,858	"	46,354,189	"
1895.....	5,991,568	"	53,176,205	"
1896.....	7,876,000	"	65,412,000	"

The following table shows the imports for 1896 by articles:

IMPORTS OF MACHINERY.		In rubles.
Machines and apparatus of copper and brass.....		109,000
Dynamos.....		1,214,000
All kinds of steam motors.....		4,316,000
Gas and petroleum motors (copper).....		343,000
Locomotives (portable engines).....		646,000
Textile machinery.....		7,501,000
Wood and metal working machines and others.....		2,745,000
Typographic and lithographic machinery.....		401,000
Sewing machines.....		2,744,000
Fire engines.....		40,000
Different machinery of cast iron.....		16,813,000
Locomotives.....		10,297,000
Plows.....		1,615,000
Harrows.....		47,000
Reapers.....		986,000
Threshers.....		912,000
Sorters.....		127,000
All other agricultural machinery.....		2 223,000
Locomotives with threshers (complicated system).....		1,152,000
Parts of machines (cast iron).....		10,702,000
Parts of machines (copper and brass).....		476,000
Total.....		65,412,000

The total production of pig iron in 1896 in Russia was quite inadequate to the demand. This deficiency has been, until very lately, a constant impediment to the development of the metal trade, which can only be relieved by the importation of foreign goods. The Russian producer, who is favored by a protective duty of 75 copecks (about 53½ cents) per pood (36 pounds) on finished goods, has to pay twice as much for raw material as the foreign manufacturer, which makes it impossible for him to compete. Russia will doubtless continue to offer a ready market for machinery.

With regard to agricultural machinery, it may be gathered from the following table that during the past ten years, in spite of the duty, which, of course, enhances the prices and restrains the consumption, the imports have considerably increased. The imports, showing the country of origin, were as follows:

### IMPORTS OF AGRICULTURAL MACHINERY.

	Quantities in poods (1 pood = 36 lbs.)					
	1885.	1890.	1893.	1894.	1895.	1896.
Germany.....	229 447	205,104	279,248	379,769	335,518	432,080
Great Britain.....	143 605	159,857	314 908	383 160	225,533	120,435
Austro Hungary...	86 625	72,721	54,495	76,057	128,715	85 526
Sweden.....	16,925	3,767	6,330	4 207	2,785	1,665
United States.....	3,148	12,425	56,633	149,916	227,156	223,726
Belgium.....	1,649	.....	6,233	1,812	7,973	2,453
Denmark.....	2,080	424	1,460	645	1,820	3,266
France.....	910	436	618	898	908	1,477
Totals.....	489,142	475,974	724,908	1,008,744	939,126	882,361

During this period the imports of agricultural machinery have doubled. Different causes explain the fluctuations. From 1890 to 1892 the bad harvests impoverished the farmer and diminished his purchases; in 1894 the duty was reduced (for the most favored nations) from 70 to 50 copecks per pood; the tariff war with Germany came to its end after having lasted eight months (July, 1893, to March, 1894,) and the imports increased suddenly to about

1,000,000 poods and more than 5,000,000 rubles. Regarding the countries of origin, the most prominent fact is the development of the American imports, which, in 1885, held only the fifth place, and in 1895 took the second rank, immediately after Germany, which position they retained in 1896, the exports from Great Britain falling still farther to the rear, as did those from Austro-Hungary. A study of the relative rates of increase would be still more instructive, the imports from Germany having increased only 89 per cent., while those from the United States have increased over seventy-fold.

Still more satisfactory is the fact that the present outlook is equally encouraging. The *New York Commercial*, of March 21st, reports that 6,000 tons of agricultural machinery left New York for Odessa, Russia, March 20th, on board the steamship *Fernfield*, and a similar cargo went out for the same port on the *Remus* on April 2d. Five great concerns alone shipped 27, 20, 15, 5 and 4 carloads respectively. These heavy shipments will be followed by others, and it is the confident expectation that American trade with the people of the Czar's dominions will grow to many times its present proportions.

One of the greatest evils of Russian agriculture is the lack of a rational use of agricultural machinery. Most of the peasant farmers still use heavy wooden plows, before which 12 oxen have often to be spanned. The Caucasian Agricultural Society is now endeavoring to popularize agricultural machines, and to induce the farmers to purchase them by means of practical demonstrations, and good results have been obtained. In Turkey-in-Asia a commencement has been made with the importation of agricultural machinery. Plowing is still carried out in the old style, i. e., by means of a long beam pointed with iron, and drawn along by a horse or other animal.

There are now conditions developing in Russia and Siberia which encourage our manufacturers in the belief that large as their trade is at present it is really only in a growing state. Railroads are beginning to penetrate into hitherto remote agricultural districts, thereby making a market for the peasants' wheat and opening new fields for machinery. The same march of progress, if in a lesser degree, that developed our Western States, is now going on in Russia and Siberia, and the American manufacturer seems to be alive to the situation.

## The Hay Tedder.

IN this age of invention and improvements it is very interesting to note the ever-changing methods of doing work. We often wonder when improvement will cease and perfection present itself. No doubt the agricultural field is as interesting a study as can be found. The crude tools of the past are nearly forgotten; the sickle giving way to the cradle; the cradle to the reaper; the reaper (in level sections) to the self-binding harvester, and so it goes. When the writer was a boy he thought when his father brought home our first mowing machine—the old one-wheel Kirby Clipper—that the acme of success had been reached. It not only cut the grass much faster and easier than we could by hand, but father said we would also be able to get the hay cured without stirring it from the swath, as we always had to do. In this latter calculation we were disappointed, as the heavy hay would bleach on one side while the other remained green or wet, and to my great disappointment I had to take the fork again to stir out the hay, as we found when we came to market it that dealers, upon finding any not properly cured, would make the price of the entire car or load by the poorest lot found, rather than by the average condition. After our first year's experience in trying to cure our hay in the swath we were very particular that it should be stirred when the least bit heavy, and we found by taking care in this respect that we could always find quick sale in the home market, when loads of badly cured hay would often stand all day without a buyer. The method of stirring hay has changed, but the demands of the market are the same. Hay, to bring the best price, must be well and evenly cured. The up-to-date farmers have adopted the hay tedder as one of the most valuable requisites of the farm, because it gives their product the highest value by the evenness of drying, and is a great saver of time during haying, when the hours are so valuable. It is also possible to cure the hay without the hot rays of the sun when a tedder is used, as it shakes it up thoroughly and allows the air to pass through it. A New York firm, who are large manufacturers of tedders, not long since sent out a general letter to dealers, asking whether or not they made any difference in the price of tedded and non-tedded hay. In nearly every instance it was stated that a material difference existed, some naming as high as \$4 per ton more for hay tedded. Of the letters submitted by them a just average would be from \$1 50 to \$2 per ton in favor of hay cured by use of a tedder. Dealers handling up to date tedders last year cleaned out their entire supply, and the demand in this line will be still greater this year, as the farmers are awaking to the fact that they cannot afford to do without them.—*Exchange*.



## American Agricultural Implements in Great Britain.

ONE of the leading technical papers in London, referring to the exhibit of implements at the Smithfield Club Show, in London, last December, said that it was a satisfactory sign of the times to observe that English makers were following pretty closely upon the lines of the "enterprising Americans," whose competition had been so serious a feature of the trade for some years past. "In many ways," added the paper, "we can profit by the lessons taught us by these American competitors." Curiously enough we have the evidence of the *London Engineer*, a high authority, to the effect that for some years past no very great novelties or improvements have been exhibited by British implement dealers, because they have now arrived at a high state of perfection! If so, well, the American exporters will have the English market still more to themselves, because they, at least, have not got tired of trying to improve, as visitors to the American section of the Smithfield show found to their pleasure.

Towards the end of last year the annual meeting of R Hornsby & Sons, Grantham, England, well known farm tool makers, was held, at which some queer things were said. I want to draw your attention to a few of them. The chairman had to explain the reason for reduced dividends, and he told the irritated shareholders that there were reasons why a large profit was not likely to be made. One was that the machine of which they made large numbers ten years ago at £40 (\$200) was now selling owing to American competition, at £30 (\$150). The present depressed condition of things was mainly due, he said, to American competition. Americans sent harvesting machinery into England and sold it at prices less than British makers could produce it. In addition to our expenses they had the cost of freight and agencies, and if they could do it in England how much more could they so compete with us in the colonies and foreign markets, where we had the cost of extra freight and agency charges. And then the chairman of this English company went on to tell his audience what I have been telling Americans for years, namely, that the only way England can compete in the future in the open markets of the world is by putting down the most up to date and perfect machinery. Better machines have now been invented, which one man can operate and turn out more work. Owing to the present condition of affairs English manufacturers have to go to the United States for such machinery, which is not very creditable to the British engineering trade.

The difference in the methods of manufacture in England and in America is gradually becoming recognized in British industrial circles, and was referred to on the occasion mentioned above. "In the United States," said the speaker, "men work in spirit with their employers. They take a pride in turning out the greatest amount of work their machines can do, and always strive to make a record output." This is quite different to English operatives, who are governed by their trade-unions and only allowed to work machinery at a certain rate, much less than the American output. "United States workmen are cheaper than Englishmen at low wages," is another admission which your correspondent pointed out years ago. "British manufacturers could bring over to England machines which would save the labor of three men, but the trade-unions will only allow them to save the labor of one and one half men."

I do not think any more evidence of the difference between the two methods is needed to convince any one that your system is the best, and that it is leading you to supremacy, not only in England, but throughout Europe and the world generally. That was the real cause of the lockout in the engineering trade, and which the masters have rightly won. If they can thoroughly conquer the restrictions of the unions English dealers will yet prove stern competitors in foreign markets. That American implements have found a home in these islands is beyond proof. The increase in the imports from the United States from \$380,000 in 1888 to about \$683,000 in 1897, together with their appearance at agricultural shows, in implement dealers' stores, etc., places the matter beyond dispute. British agriculturists find that they can get better work done with American implements, and that causes the demand to increase, especially when we remember what the *London Engineer* says about British farm machinery not showing any marked sign of improvement for years past.—London correspondent of *The Farm Implement News*.

### American Slate.

THE fact that the exports of American slate have increased from \$40,000 in 1895 to nearly \$1,000,000 in 1897, with fair prospects of exceeding that figure in 1898, has aroused considerable interest abroad in this industry. There are several rich slate regions within the United States, but the richest is probably that in Pennsylvania. The slate region of Pennsylvania, about 50 miles in length and 13 in width in Berks, Lehigh, York and Northampton counties, lies between the anthracite coal regions of Schuylkill County on the North and the

limestone farms of Berks and Lehigh and adjacent counties on the South. The country is rough and rugged, with winding watercourses flowing South. The hills average about 600 feet above tide water. There are very few natural exposures. Slate lies under the surface and at times can be traced in deposits here and there for 3,000 feet. The upper beds of slate are from two to four feet thick, sometimes many more, while the lower beds are less.

The manager of one of the largest concerns doing business in this region thus describes how the American slate men first came to enter the foreign market: "In the history of the trade prior to 1895 the United States sent very little slate abroad. The great Welsh quarries supplied Europe. But in 1896 occurred the great strike at the Pen Ryn quarries in Wales, which has a capacity of 2,000 squares a day ('square' of slate means as much slate as will cover 100 square feet), and employs from 2,000 to 3,000 men. It was a long strike, and a bare market in Europe gave American slate producers a chance. We took advantage of it, increased our sales in Europe and Australia to over \$800,000 in 1897 and, notwithstanding the fact that the big Welsh strike was settled in 1897, we gained such a strong foothold and established such an excellent reputation for American slate that London, Liverpool, Glasgow, Dublin, Paris, Berlin, Vienna and many other leading European markets are still taking American slate and, it is likely, will continue to do so. We sell direct to the foreign buyer."

According to the same authority the largest single firm handles no less than 50,000 squares of roofing slate per annum, over 40,000 of which go to foreign countries. They do not quarry this amount themselves, but they buy or control the output of a number of quarries. Their own output may reach 30,000 squares.

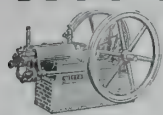
### Butter for Export.

MUCH of the butter made in the United States is still produced as a by-product of the farms. Butter-making for the extensive home and foreign markets, however, has become within recent years an industry of more than secondary importance. The present national administration is engaged in assisting, through the Agricultural Department, the American butter-makers who desire to reach the foreign markets with their product. Already the export trade is good and it is increasing. Butter exports from the United States for the year ending June 30, 1895, were 5,500,000 pounds; for the year ending June 30, 1896, 19,000,000 pounds; for the year ending June 30, 1897, 31,600,000 pounds; for the calendar year 1896, 27,000,000 pounds, and for the year 1897, 31,000,000. As long as practically all the butter made on American farms was consumed there or in markets purely local but little attention was paid to securing uniformity of the product and a high standard of quality. The creamery business is effecting a revolution, and butter-making, when well done, is highly profitable.

The National Association of Creamery Butter Makers, at the meeting held recently, indorsed the work of the Agricultural Department in assisting in the development of foreign markets for the dairy products of the United States. It urged further that the department enter upon the work of inspecting and grading butter and cheese intended for export and official branding of the same in the same manner as meats are inspected and branded. There is no question about the ability of the American butter-makers to put on the market butter that will suit the most fastidious taste, and the inspection and branding policy suggested would soon result in giving American export butter a name and standing in the markets of the world equal to the best.

**Wool from Stones.**—In this remarkable age of progress people are fast learning that they must be prepared to accept with little wonder, question or surprise, anything in the way of development and invention that may come, announced or unannounced. Yet we venture it that there are few people who will not stand amazed to learn that letters patent have been applied for at Washington by a young Indiana chemist and scientist who claims—and his claim is backed up by reputable men—that he can make the softest and whitest, yet most durable, wool from the hardest and roughest limestone in existence. If his own words are to be believed, the process which operates to bring about this remarkable change is a very simple one, and easily feasible from a financial standpoint. If this be so, we of the present generation may yet live to see some of the modern day skyscrapers converted into very comfortable garments to protect from the wintry blasts, as the buildings themselves now do. But what of the sheep and the wool growers? How will they be affected? In two towns of the State of Utah alone, during the succeeding month, 300,000 fleeces will be shorn from the flocks. These growers, and others of their kind, will scarcely hail with delight an invention that would tend to "invent" them out of their livelihood. But the good of the many, rather than of the few, is what must first and always be considered.

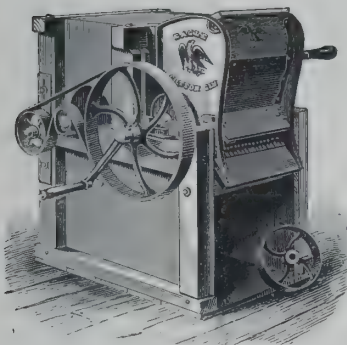


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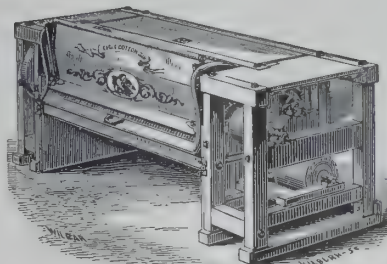
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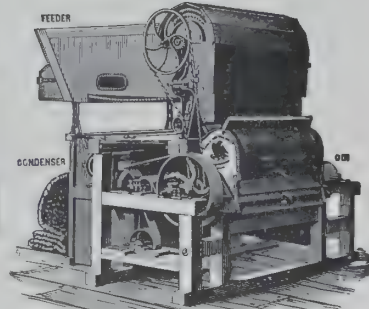
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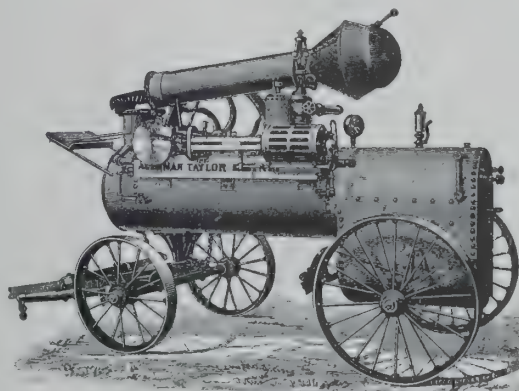
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Iron Tanks



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## COMMERCE ON THE GREAT LAKES.

OUR foreign readers will be interested, and some of them somewhat surprised, to learn that the United States possesses an inland shipping that actually surpasses in volume and importance both its foreign and coastwise shipping together. The story of the great development of trade on the great American lakes is one of the most remarkable in the wide domain of industrial and commercial activity. In the fourscore years which have elapsed since the inauguration of steam navigation on this great chain of inland seas the growth of the shipping interests has at all times been constant, and in recent years the increase in the volume of traffic has been truly marvellous. When the settlement of the great Northwest had opened up its vast storehouses of agricultural and mineral wealth the farmer and the miner found ready to hand in this noble waterway a cheap and easy route for the transportation of their products to Eastern markets.

While it is true that the volume of trade on the lakes is largely due to the advantageous location of this waterway in regard to the natural flow of traffic, much credit is due to the energy with which the facilities of travel have been enhanced by the efforts of the engineer and the capitalist, and by the fostering care of the governments of the United States and Canada. The efforts of the capitalist are manifest in the construction of special types of vessels suited to the requirements of traffic on these inland seas and in the vast and excellently equipped docks and loading facilities which abound at all principal points. The hand of the government is seen in the deepening of channels, the improvement of harbors and the construction of canals where natural obstacles limit or absolutely prevent the passage of vessels.

The most noted work of improvement by the government is that which has been carried out at Sault Ste. Marie, on the rapids of St. Mary's River. St. Mary's River is the natural outlet by which Lake Superior discharges into Lake Huron, and near its head are situated the famous sault or falls from which the thriving American city takes its name. The total fall of the river is some 18 or 19 feet in a distance of half a mile, and while the obstruction furnishes a valuable source of water power it absolutely prevents navigation.

The first ship canal around the rapids was built by the State of Michigan in 1853 to 1855. This proved to be inadequate to meet the demands of the rapidly growing commerce of the West and was superseded in 1881 by a far larger canal built by the Federal Government at a cost of \$2,150,000. A third was begun in 1888 on the Canadian side of the river. Each of these canals has but a single lock—a very imposing structure in each case, the American being 800 feet long, 100 feet wide, 44 feet high without and 20 feet deep within, the Canadian 100 feet longer and 40 feet narrower.

The tonnage passing through the American canals during the eight months of the year 1896 was 17,249,418, whereas the total amount passing through the Suez Canal in the whole twelve months of the same year was but 8,594,307 or less than one-half as much. The mean tonnage of the lake vessels was 927 as against a mean tonnage of 2,788 for those passing through the Suez Canal. Of course, it will be understood that the Suez Canal ships are on long voyages and many of them pass the canal only once a year, whereas the lake ships will some of them pass the canals from forty to fifty times in a year. The figures of the two canals show the actual tonnage passing through and are not an indication of the total number of ships employed. Thus the "Soo" traffic was represented by 18,618 lockings and the Suez traffic by 3,047 passages of the canal. Of the total registration through the American canals 4,391 were sailing vessels and 13,404 were steamers.

An analysis of the traffic shows that the figures for the leading items of freight were iron ore, 7,909,250 tons; coal, 3,023,240 tons; wheat, 63,256,463 bushels; other cereals, 27,448,071 bushels; flour, 8,882,858 barrels; lumber, 684,986,000 B. M.; pig iron, 121,872 tons; copper, 116,873 tons; salt, 237,515 tons. The total value of the freight was \$195,146,842, and the value of the fleet that carried it was estimated at \$43,000,200.

Duluth is, by virtue of its geographical position and its vast and ever-growing trade, the Chicago of the Northwest, and the vast amount of trade that seeks this city as being the most westerly shipping point on the lakes has caused it to grow in a few years to a leading position among the great ports of the world. The ore docks, of which there are two, were constructed at a cost of \$860,021, and have a capacity of 92,160 tons. They are typical of the great system of ore docks that is to be found on the shores of Lakes Superior and Michigan. It is estimated that the combined capacity of these docks on the two lakes is 633,805 tons, and their special loading facilities are such that a 5,000-ton vessel can be loaded in the space of a few hours. The total capital invested in mines, railways, docks, etc., concerned in the mineral traffic of this region is approximately \$240,000,000. The entire commerce of the great lakes

is estimated to amount to between 32,000,000 and 34,000,000 tons, and in the successful endeavor to encourage this traffic by deepening harbors and channels and improving and protecting waterways, the government has expended some \$281,000,000.

The necessities of the lake traffic have produced a special type of cargo steamer which is a compromise between the barge and the ocean freight steamer. Of recent years a remarkable fleet of these large ships has been launched and it is growing rapidly, both in numbers and the size of its individual boats. Among these are such vessels as the "Bessemer," 432 feet long by 48 beam and 28 feet draught; the "A. Carnegie," about the same dimensions, which has carried as much as 5,586 tons of grain on a single trip. The later ships show a continued tendency to increase size and tonnage.

In conclusion it should be mentioned that this vast traffic is carried at a surprisingly low rate per ton. For the ten years, 1886 to 1896, the average cost was 1.35 cents per ton per mile. Since 1893 it has been less than 1 cent.

## American Copper Production.

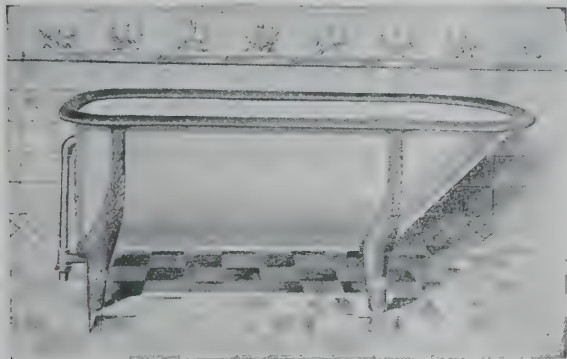
SOME years ago it was pointed out that a copper mine was a far more profitable possession than any save the richer kind of gold mines. With copper selling at 12 cents a pound in New York and at over £50 a ton in London, this view of the industry gains additional force. Boston, which has devoted itself to the exploitation of the copper deposits of the United States, has, particularly in the last year, had ample reason to congratulate itself for the energy and persistence with which its financial interests have pursued this matter. Not only is the Calumet & Hecla, one of the really great copper properties of the world, a Boston property, but the business men and capitalists of that city have developed a remarkably large proportion of the productive and dividend-paying copper mines of the United States. The advance in the price of copper has increased the profits of these properties to a marked extent, and while the market for copper-mining shares has, of course, discounted their prosperity with a very fair-sized speculative boom, it has not been an excessive one.

There is reason to believe, however, that the copper production of the United States is capable of still greater expansion. This country now supplies considerably more than half the world's output of the metal, having produced in 1896 over 200,000 tons out of a total of about 375,000 tons. In 1897 even this record was surpassed. But in the opinion of many mining authorities the copper deposits of the United States have been barely scratched over. The recent developments in connection with the demand and price for the metal have naturally given a decided impetus to the search for other mines which would rival in productiveness the rich one of the upper Michigan peninsula or of Montana. Rumor has it that the prospectors who have been searching the Rocky Mountains from Arizona to the British border have been rewarded with a number of rich finds. There is, of course, a possibility that such alleged developments are intended for the Boston copper share market, which is just now quite ready to receive promising schemes of this kind with favor. Scientific investigation has, however, indicated the probability of further large copper deposits in the Western States. In their search for gold and silver only, the prospectors who have ransacked every district from the foothills of Colorado to the Coast Range of California may have passed over a great deal of wealth in the shape of the humbler, but, as it turns out, fully as profitable metal. A vigorous effort is now being made to correct such errors of judgment and the next year or so will in all probability see a vast increase in the country's copper product. Meantime the consumption of the metal increases apace, and it is a fair conclusion that the discovery of additional sources of supply will fail to bring any overproduction or result in a very marked decline in prices unless indeed several Calumets, Anacondas and Rio Tintos are unearthed and set to producing at the same time.—*The New York Commercial*.

"Man a Tool-Using Animal."—It has been said that "Man is the only tool-using animal." This is not only true, but significant of what this exclusive ability has done in shaping the destiny of the human race. It marks the difference between the savage and the civilized man, the one pounding his maize on a stone and the other making flour in a grist mill; the aboriginal that shapes a boomerang with a flint or a fish bone, and the artisan that carves with a chisel or makes a bracket with a scroll saw. A writer in the *Pittsburg Labor Tribune* very forcefully and pertinently says: "We may readily see that social systems and forms of government change as the tools of production change. The evolution of tools of production swept away the slave system of ancient Rome and ushered in the feudal system." It is working the same changes now, and will continue to do so, with results working along the same lines. We cannot separate the labor-saving tool from the progress and betterment of manhood.



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The Finest  
Steel Enamelled Bath Tub  
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Light and Strong.

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## THE ENAMELITE TUB

is made of Galvanized Steel to insure against rusting. Nickel-plated Waste and Overflow. Enamelled outside in light blue; inside is finished in five coats of Japan Enamels, baked on, producing a beautiful white, porcelain-like finish.

The Steel-Encased Tub is made of smooth rolled black steel jacket, lined with Sheet Copper, tinned, planished and polished to a mirror finish. Outside finished in light green enamels. Wastes nickel plated.

SIZES: Both kinds 4½ feet, 5 feet, 5½ feet over Rims.  
WEIGHT: 115 lbs. to 130 lbs. in shipping crates.

Sample orders solicited.  
Prices on application.

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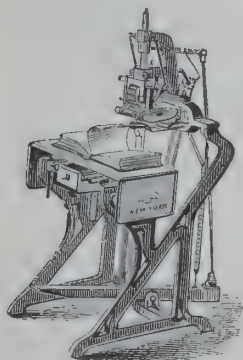
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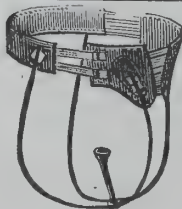
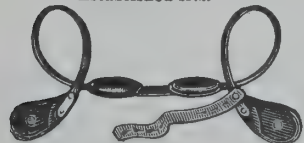
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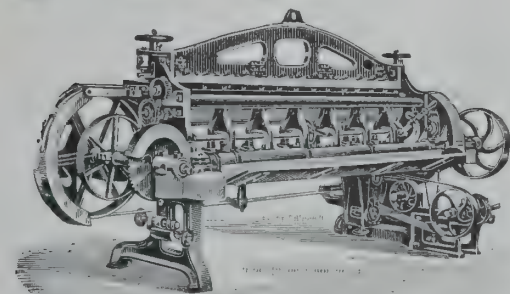
FRANKFORT-ON-THE-MAIN, GERMANY.

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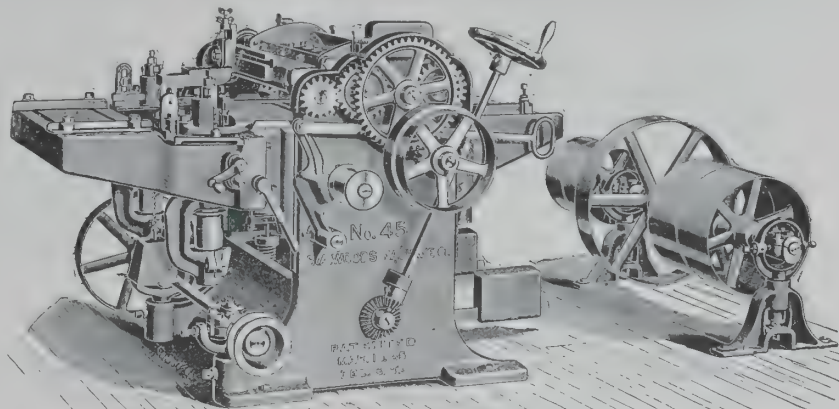
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No. 45.—Planes one side and matches up to 12 inches wide. Works 6 inches thick, or will plane one side 24 inches wide without matching. Weight, 2,700 lbs. Packed for sea shipment. Measures 160 cubic feet. All goods delivered free on board steamer.

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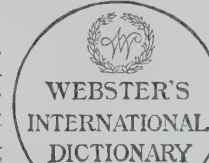
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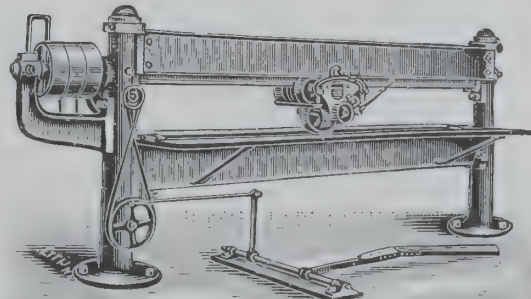
## Manufacturers of all kinds of Indestructible TRUSSES,

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No. 76. Butt Roller for tanners.





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**FRAME.**—Best quality of weldless steel tubing is used. Main frame, 1½-inch; head, 1¼-inch; lower rear stays, ¾-inch, D shape, tapered to ¾-inch; upper rear stays, ¾-inch.

**FRAME CONNECTIONS.**—Flush joints.

**SPROCKETS.**—Steel detachable, 20, 22, 24 and 26 tooth front; 8, 9 and 10 tooth rear.

**HANDLE BARS.**—Steel adjustable.

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**BEARINGS.**—Disc adjusting, made from best tool steel, scientifically tempered and carefully ground to remove any roughness caused by tempering.

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**OIL CUPS** are provided, which convey the oil direct to the bearings.

**HUBS AND CRANK-HANGER.**—Barrel pattern

**WHEEL BASE,** 43½ inches.

**WIDTH OF TREAD,** 5½ inches.

**CRANKS AND SHAFT.**—Two-piece, joined in center.

**FINISH.**—Black, maroon or green, plain or striped and decorated.

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**CHAINS.**—Superior make, "B" block pattern, centers and pins hardened.

We also make **HIGH-GRADE TANDEM**s and **JUVENILE WHEELS**.

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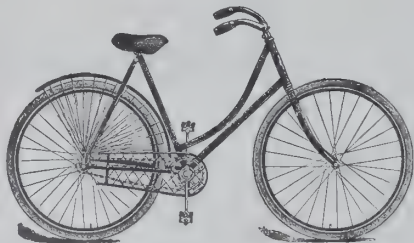
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## THE BLACK MFG. CO.,

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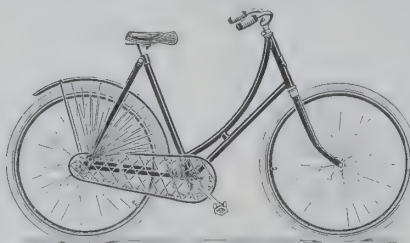
are known the world over for their excellent finish and reliable quality.  
Write for export prices. We deliver our machines properly boxed, freight prepaid, to New York City.



Tribune Model 33. Price, \$50.00.

Model 33 is a bicycle of excellent quality and finish, and far superior to many machines listing at higher price. The frame is weldless steel tubing of best quality, built in two heights, 23 and 25 inches; wheels, 28 inches diameter; gear, 73; cranks, 7 inches. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, gold striped, nickel trimming. Weight, about 23½ lbs.

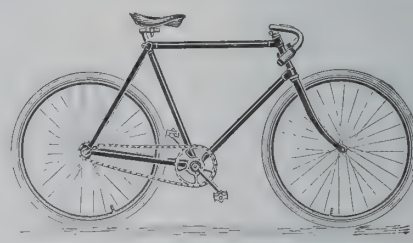
**ARENA MODEL M.** Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 34. Price, \$50.00.

Model 34 is practically the same as Model 33, excepting that it is built with drop frame, 20½ or 22½ inches, for ladies' use. Weight, about 24½ lbs.

**ARENA MODEL L** is very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.

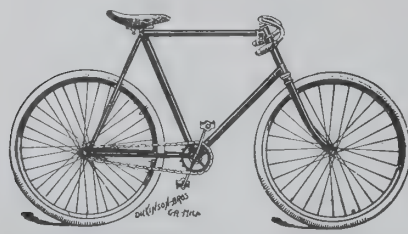


Tribune Model 350. Price, \$75.00.

Model 350 is built for road racing and for all purposes where a light wheel is desired. The frame is built in 23-inch height only. Drop to hanger, 2½ inches; 7-inch cranks; Tribune special single-tube racing tires. Weight, about 21 lbs. Finish, black, gold striped.

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Halladay Roadster, \$100. Discount, 45 per cent.



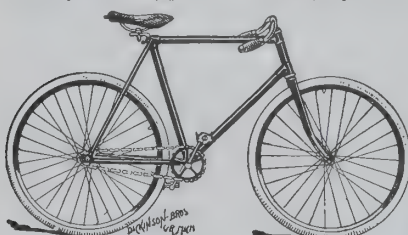
Lady Halladay, \$100. Discount, 45 per cent.



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26-inch Boys' Aetna, \$50. Discount, 40 per cent.



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## MARION CYCLE COMPANY,

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Prices quoted with discounts are our BEST and cannot be beat for quality offered. Can refer to largest dealers in America. Complete line for reliable service. Orders accepted through reliable commission houses. Mail exact copy of order direct to us Direct orders must be accompanied by Draft on New York or San Francisco. All goods carefully boxed for ocean shipment, F. O. B. New York; or delivered San Francisco or New Orleans, \$1.00 net extra per machine. Send for Art Catalogue mailed free.





### Era of Imitation.

TRULY this is an era of imitation, and the surest test of the popularity of an article lies in its imitation or lack of it. There are few articles that escape the keen eye of the copyist, no matter how well protected by patents, and in spite of the vigilance of the patentees ever on the lookout to prosecute infringers. If it is worth while the article will be copied almost outright; or, if this cannot be done, it will be imitated as closely as the patent laws will allow; while if this is not close enough to suit purchasers, a clean steal will be made, and suit for infringement resisted to the bitter end. Sometimes it would cost more to prosecute than it would be worth, and the pirate escapes in this manner. Again, the imitators just manage to keep their skirts clear of liability incurred by infringing, while reaping all the benefit of such infringement.

It used to be that bicycle patents were broad enough to kill the business of competitors if they could be enforced. It was then a question of confining the manufacture of bicycles, and occasionally of tires, to the very small number of concerns who owned or controlled the patents on ball-bearings, saddles, etc. Now it is very different. There is scarcely a patent, except those on tires, that in practice is found to prevent rivals from making articles like it or bearing a close resemblance to it. There are numberless patents on saddles, pedals, handle bars, rims, etc., as well as others on shop methods of constructing crankshafts and other parts, but if a maker desires to imitate any of them he seldom hesitates to do so on account of any patents that may be in existence, and he is still more rarely brought to book for so doing.

A new phase of this policy of entirely disregarding other people's rights is to be found in the willingness of a number of manufacturers, whose specialty is the building of machines to order, to imitate the distinctive features of well known makes. If a jobber or dealer will place with them an order sufficiently large to warrant them in entering upon the undertaking, they will contract to build machines the exact counterpart—in outward semblance, at least—of well-known and reputable machines. For instance, if a dealer fears the competition of a certain machine, whether because of its excellence and taking qualities, or by reason of its being extensively advertised, he can have built for himself machines exactly like it, apparently, and retail them (at a good profit) for less than his competitor pays for the original.

Of course, there is a big difference in the two machines. The counterfeit is decidedly the inferior in material and workmanship, lacks many of the fine points of the original, and is really worth no more than the price asked for it—sometimes much less. But it looks like it, and the wily dealer makes the most of his opportunity. To the knowing ones he will dwell upon the points of similarity, and insinuate that the only difference is in the name. In some cases, to country customers and others where he feels reasonably sure of not being caught, he will palm it off as the genuine, with a plausible story about the absence of the name-plate; sometimes he will imitate the name plate very closely, and thus carry the deception farther.

In the export trade the temptations to impose upon the buying public by means of imitations are especially numerous, and dealers who desire to handle only honest goods should be constantly on their guard. The shipping agent may have little to lose, but the local dealer risks forfeiting the confidence, and ultimately the trade, of his locality.

### Increased Weight of Bicycle Frames.

THE marked increase in the weight of machines that has taken place during the past two or three years has been due, to quite a considerable extent, to the use of heavier tubing and frame joints.

In the days of the featherweights if a frame or other part of the machine broke, or failed to perform the duty required of it, it was considered a sufficient excuse for the maker to say that as the public insisted on the weights being kept down they must take the risk of failure. That stage has passed, and in case of mishap there is apt to be an investigation of the cause of the

breakage, and the blame placed where it belongs. Consequently weights went up, until now most of the machines are of ample strength, and the difference between the present efficiency and the lack of it a few years ago is very striking.

The tubing used in a majority of the machines of to day is very much more capable of resisting the shocks to which it is subjected than was the case a few seasons back. Makers, designers and superintendents have all learned that it does not pay to use excessively light tubing, even if bolstered up with reinforcements, and that the smaller number of times the tubing is subjected to the heat the more it will stand after it gets into the frame. A 23 or 24 gauge tube, reinforced at both ends, is but little lighter than a plain 20 or 22-gauge one, and it would not be as strong and rigid even if the ends had not been affected by the heating process; still more marked is the deterioration when this has been done. Breakages almost invariably occur at the end of the reinforcement, and it is frequently found that the spelter has not flowed and firmly united the two pieces of metal, making a weak point that is almost certain to give trouble.

Various expedients have been resorted to to obtain the desired qualities in the frame. Some makers select tubing of an unusually heavy gauge, particularly for the points of greatest strain, placing but small dependence on reinforcements, and sometimes discarding them entirely except for the forks and fork stem. Others use tubes with an internally tapered gauge, thus obtaining the advantages of the reinforced tube, but without the drawback of having to braze the reinforcements in. Of course, there is danger of the tubes crumpling or telescoping under the stress of very severe shock, but makers take the stand that their duty is performed when they have provided against ordinary strains and shocks. If the tube is of heavier gauge all the way through, the frame will resist almost anything, but it must be admitted that some weight is added.

Of late years the tubing itself has come in for a good share of attention. It was found that if more carbon was added the stiffness so much desired in tubing was obtained. Therefore it became possible for the bicycle maker to use a lighter gauge of tubing without lessening the rigidity of the machine, or to retain the same gauge and increase the rigidity. In many cases the temptation to reduce the gauge of the tubing, in order to offset the additional weight imposed by changes in other parts of the machine, was too great to be resisted. Thus it sometimes happened that the improvement in the quality of the tubing brought no real increase in strength or rigidity.

It was found, too, that it was easy to go too far in adding to the stiffness of the tubing. The greater amount of carbon in its composition the more brittle it became. There was a point where this brittleness did no harm; where there was no more danger of breakage than in tubing of a more malleable character. It was just that point that most tubemakers endeavored to reach and not to pass. That they succeeded is shown by the greater efficiency of the machines of last year. Inquiry among tubemakers affords ground for the belief that even better results may be expected from this year's product. The experiments that have been conducted by nearly all makers, having in view the determination of just how much carbon should be used in the manufacture of tubing, should bear fruit. At any rate, the tubemakers confidently expect that such will be the case.—*The Wheel*.

### American Patents During 1897.

THE annual report of the Commissioner of Patents for the calendar year 1897 was laid before Congress March 14th. In 1897 there were received 45,661 applications for patents, and, in addition, a large number of applications for designs, trademarks, etc.; 23,729 patents were granted, including designs; 65 patents were reissued; 1,671 trademarks registered, and 14 labels and 16 prints. The number of patents that expired was 12,926. The total expenditure was \$1,122,843; the receipts over expenditures, \$252,798. The total balance of the credit of the Patent Office in the Treasury of the United States on January 1, 1898, was \$4,971,438.

In proportion to population more patents were issued to citizens of Connecticut than to those of any other State—one to every 786 inhabitants. Next in order were the following: Massachusetts, District of Columbia, New Jersey, Rhode Island and New York. To residents of England 706 patents were issued; to residents of Germany, 551; Canada, 286, and France, 222. The number of applications received for examination during the year was greater than for any other in the history of the office. Applications awaiting action December 28th last numbered 11,382, due to the inadequacy of the office force. For the ten years beginning in 1840 the average number of applications was 1,186, and for the eight years beginning with 1890 it has grown to 41,479 per year.



### Tandem Trade.

**D**URING last season, when tandems were being advertised at kill 'em quick prices by certain department stores, it was suggested that it was time for life saving associations and societies for the suppression of vice to intervene, and that the urging has lost none of its force is proven by a local store, which advertises a job lot of tandems for sale at \$27.50 each.

The price leads one to wonder what the tandems were made to sell for, and whether they will hold together long enough for the riders to get astride them. It is altogether probable that the purchasers will find out all about them without any unnecessary delay; but a tandem is no toy in some respects, and in some hands is a ticklish instrument, and in instances such as this unwary purchasers should have some safeguard thrown around them.

The true inwardness of tandem building affords room for considerable study. Any manufacturer of bicycles can build tandems, but the number who can build good ones is very small. It will not do to assume, as many makers do, that a tandem should weigh about twice as much as a single bicycle, and cost about 50 per cent. more, and that there is nothing more to it. There is a great deal more to it, and the strength and durability, as well as the easy running of the tandem, depend on mastering this information.

The most common fault with tandems is that they are not strong enough, particularly the frame. There are certain points of construction that should be, but often are not, observed here, in order to make a frame that will resist the tendency to sag and finally break under the weight of the riders. To obtain this strength it is necessary to use very heavy tubing for some portions of the frame. If this is done neither the weight of the riders, nor the tremendous strain of two riders applying power to the pedals, will have any appreciable effect in throwing the frame out of line. If these points are observed in the building of the tandem the popularity of this form of cycling will show a marked increase.

There is undoubtedly a great deal of pleasure to be obtained from tandem riding, but it must be pursued in moderation or with a thoroughly experienced partner. It should be borne in mind that two persons on a tandem can accomplish better results than they could on singles, but only by a greater expenditure of effort.

This is true particularly where there are many hills encountered. Even the best tandems require a lot of work to force them up hills, partly because it is absolutely necessary to go faster than on single machines. The same remark holds good as to the distance covered. The riders will experience more fatigue at the end of a day's journey, but considerably more ground can be covered.

In spite of this the tandem has many good features to recommend it. A trip undertaken by strong and weak riders together, each endeavoring to regulate his pace by that of the other, until there is little pleasure in it for either would be quite different if the two were mounted on a tandem. For short rides, and especially over good roads, such as boulevards and parkways, the tandem is far in advance of single machines. For "showing off" purposes, also, it is unequalled, a fact well understood by many riders.

It will be found a wise policy for both manufacturer and retailer to pay particular attention to the tandem trade. To be sure, the demand for such machines is limited, and it will not pay to overdo it. People who want tandems generally have the money to pay for them, and to those who have no desire for this class of machine a cut price is little temptation. Makers who have overproduced in the past have learned this to their sorrow.

The price of tandems is far from being lost sight of by buyers, however. Many riders desire them who are unable to pay the highest price for them. At the same time they are apt to require satisfactory assurances that the medium-priced tandems are good before they will buy them. A poor tandem has no attraction for them, hence the difficulty of makers who have built such machines in disposing of them, no matter how low they reduce the price.

It is rather a curious feature of the tandem trade that the demand is rarely over until late in the season. It usually begins late, also, mainly for the reason that manufacturers are late in preparing their models. Therefore, it is frequently during the Summer season that the sales of tandems are largest, and the retailer who is overstocked need not despair of disposing of some during September and October.—*The Wheel.*

### Tire Vulcanizers at Popular Prices.

**I**T is but a comparatively short time since the tire vulcanizer was introduced, yet so general has its use become that there is hardly a repair shop in the land that does not boast of one or more of them. A still further extension of the use of this handy article is now being effected, and vulcanizers for the use of riders are now being extensively advertised. That a great many riders will

avail themselves of the offer, especially in view of the extremely low price at which they can be procured, is beyond question.

In the early days of the pneumatic tire, if a tire was cut, or even badly punctured, it became necessary to send it to the factory for repair. Even there, where every facility was possessed for doing such work, it was frequently found necessary to give up the task in despair, so that the rider had no assurance that what would now be regarded as an ordinary happening could be remedied even when sent to the factory. The appearance of the vulcanizer changed all this, and enabled the repairer to satisfactorily cope with all but the most difficult cases. In the same manner the new rider's vulcanizer will remove the necessity of placing entire dependence on the repairer, and permit him to conduct the experiments that many are anxious to attempt.

As a rule, repairers seem to fear that the sale of this new vulcanizer to riders, if it assumes the dimensions that are looked for, will cause some injury to their business. That the fear is not well founded will appear upon slight reflection.

There are, undoubtedly, some riders who will attain a proficiency at tire repairing but little short of the repairers themselves, and a slight loss of trade may be expected from that source. But much the greater number of those who attempt to vulcanize their own tires will encounter the same difficulties that beset the repairers (only tenfold increased), in consequence of which they will be very glad to relinquish their new task and hand it over to those who are in a position to give it the proper care and attention.

It is reasonably certain, too, that the knowledge obtained by all riders who attempt to do their own vulcanizing will redound to the credit of the repairer. Conscious of the difficulties that are encountered, and made aware of the uncertainty of vulcanization, even at the hands of the most skillful workman, with the best tools at his command, the rider will be apt to make more allowances for shortcomings in this respect than he ever was in the past. He will be much less inclined to place the blame for an unsuccessful attempt to vulcanize his tire at the door of the repairer; he will be more open to conviction when the latter endeavors to prove that the fault is with the tire. For the accomplishment of this result there is much to be thankful for, from the standpoint of the repairer.

### "Opening Day" in the American Cycle Trade.

**S**EVERAL years ago Boston inaugurated the custom among the cycle trade of holding "open house" on the 22d of February, and this opening day has ever since been observed by all the trade in the Hub, with the exception of last year, when the cycle show took the place of these individual exhibitions. This year, in view of the fact that the Cycle Board of Trade had placed its ban on cycle shows, the trade all over the country was practically unanimous in its agreement to follow the example of the Boston trade and keep open house on the anniversary of Washington's Birthday. Brief dispatches from all sections of the country indicate that the experiment proved a great success and that the public in great numbers took advantage of the opportunity to visit the different branches and the retail stores in the respective cities. In many parts of the country the weather was vile. Notwithstanding this discouraging fact, the Boston tradesmen stated that they have never been visited by larger crowds than were on hand this year, and it was especially noticeable that during the afternoon more ladies visited the different stores than had been the custom in previous years.

What was exhibited in Boston was but a duplicate of what the trade in all parts of the country showed. The different novelties attracted attention; especially was it noticed that the crowd desired to see anything in the form of the chainless wheel. "Bicycle Row" on Columbus avenue was thronged from early morn, with a slight intermission about lunch time, until late in the evening with an eager crowd going from store to store. The souvenir and catalogue fiend was very much in evidence, but a large proportion of the sight-seers was out for real business—to see what was new in the market and make up their minds as to what they would do in the matter of purchasing a '98 mount.—*The Bicycling World (Boston.)*

**Why the "Chainless" Comes High.**—One of the most prominent advocates of the bevel gear type of chainless wheel in America has this to say as to the reasons why the price is and must remain much higher than that of the common chain form: "The cost of these wheels is high, for the reason that the cost of new machinery and plant equipment necessary to produce them involved a large outlay. The number made will not be large, and consequently this increase in the cost of production will have to be put upon the wheel itself. Five chain wheels can be assembled in the same time that it takes to assemble one chainless wheel, which shows the great care necessary in the making of this class."





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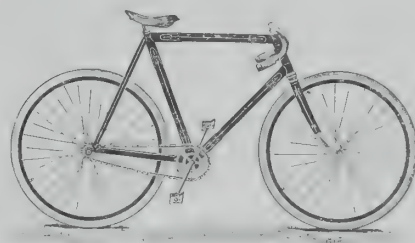
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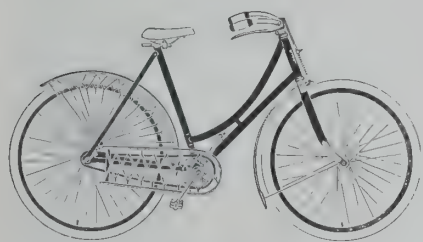
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They are strong, safe, clean, attractive.  
They produce a large, bright light. Are fitted with fine magnifying lense.  
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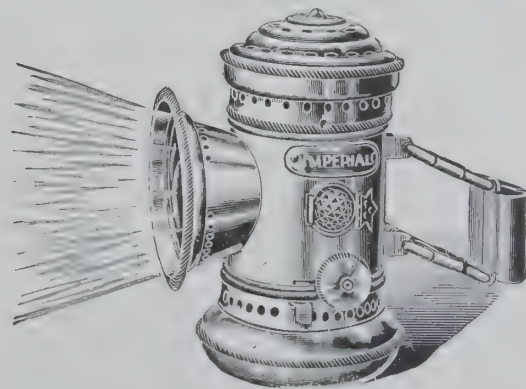
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### Influence of Invention Upon Industry.

"THE influence of patented inventions," says the recently published report of the United States Patent Office, "is most strikingly shown in the creation of new industries of enormous magnitude since 1880—that is, within the term of patents now in force or but very recently expired." Of these new industries the most noted are those directly connected with the development of electrical inventions.

The manufacture of electrical apparatus and supplies began to be of importance shortly before 1880, and in that year seventy-six establishments, employing 1,271 persons and producing an output valued at \$2,655,086, were in existence. In 1890 the number of establishments had increased to 189, employing 9,485 persons and producing an output valued at \$19,114,714.

In the electric light and power industry, as reported in 1880, there were but three establishments in the United States, employing 229 persons and producing an output valued at \$458,400. At the close of 1894 there were in the United States 2,124 central stations, supplying electricity for light and power, and 475 isolated plants, a total of 9,599 establishments. The capital invested in these central stations is stated to have been \$258,956,256, and the capital invested in the isolated plants, though not stated, probably was not below \$200,000,000. A conservative estimate of the number of persons employed at that time in this industry would not be under 45,000.

The use of electricity for power has found its most notable development in the electric railway. The first electric street railway in the United States was put in operation little more than ten years ago. In 1880 of the 2,500 road miles of street railway in the United States nearly all used animal power. The total mileage of electric railways in the United States up to October of 1897 was 13,765 miles, out of a total mileage of 15,718, of which but 947 miles were horse-car lines. The total capital invested was \$846,131,691.

The telephone in 1880 was just beginning to be commercially known. At the close of 1896 there were in the United States 967 telephone exchanges and 832 branch offices, using 536,845 miles of wire and employing 14,425 persons. The total amount stated to be invested in telephone property in 1895 was \$77,500,000.

The great development of the bicycle industry has come since 1890, as a result of the inventions in pneumatic tires made about that time. In 1890 there were reported as engaged in the manufacture of bicycles 27 establishments. In 1895 more than 200 establishments were engaged in the manufacture of cycles, and the output of wheels for that year is stated to have been not less than 800,000. The product in 1897 was over 1,000,000 wheels.

In 1880 a large proportion of the cycles used were imported, mainly from England. In 1897 the exports of cycles and parts of cycles to England amounted to a value of \$2,128,421, and the total exports amounted to a value of \$6,902,736.

### American Iron Ore for South Wales.

DANIEL T. PHILLIPS, Consul at Cardiff, writes as follows: "It has been freely rumored here and in the United States, as I am informed, that 4,000,000 tons of American iron ore have been purchased for delivery at Cardiff. The quantity would seem to be an exaggeration to start with, and the name of Sir Lothian Bell as the purchaser could hardly be correct, as his interest in iron and steel industries is confined to the north of England. But this much is certain, that local iron and steel firms, notably the Dowlais Iron Company, are somewhat exercised as to the adequate future supplies of ore. The Spanish supplies, upon which these firms are entirely dependent, are continually becoming 'poorer' in quality, to say nothing of the uncertainty as to quantity. This information I have on the best authority. Quite recently two sample cargoes have been imported from Cuba by the Dowlais Iron Company, and I have been privately informed of a recent visit having been paid to a country adjacent to Spain for the purpose of testing ores. Of my own knowledge, I may say that there is practically no limit to the quantity of iron ore for which demand may be found in this district. What is required is a good lumpy ore in what is termed 'mechanical' condition, with a high percentage of iron, delivered in Cardiff and other Welsh ports at marketable rates. As to the actual quotations, these will depend upon freight rates to a great extent; but, on general grounds, it may be argued that if ore could be brought here from Cuba at a payable price when freight rates were exceptionally high, surely there is a possibility of importing with advantage from the United States. Although discounting the reported sales of fabulous quantities, I am hopeful that from the unlimited supplies of the United States will eventually be exported enormous quantities of ore to South Wales, where a ready market will be found, if the cost question can be satisfactorily settled."

### Victimizing Great Inventors.

ONE of the neatest epigrams ever coined in regard to a newspaper has been that which says: "When you see it in the *Sun* it's so." A complementary but uncomplimentary phrase might well be applied to many of the daily journals to the effect that "When you see it in the ———, it is not so." The recent war scare is but one example of the manner in which the absurdest lies and wildest exaggerations can be given out to the public as truthful news, and it is creditable to the press in general that such disreputable instances of yellow journalism are few and far between. The enterprise of these sensational papers is their saving virtue, but even their large expenditure of money and men they do not know how to handle to the best advantage.

But it is not alone in "war news" that the worst productions of these papers have lately been seen. The field of new invention is particularly interesting, and the personality of a great inventor offers peculiar charms to them as a theme around which to weave imaginative yarns. Of late Mr. Edison and Mr. Tesla have suffered greatly from the efforts made to describe their work in the lurid columns of the Sunday issues, and the effect of seeing a thing in print is such that we have no doubt both of these inventors have suffered in the estimation of the respectable public from the manner in which their names have been associated with all kinds of foolish and crazy stories. Sometimes the articles have a genuine interest, but even then the points are made so vaguely it puzzles people to find out just what the real idea is.

All this might not be so bad, however, but when a man is made responsible for long, "continued" stories, patience is at an end, and thus it was that recently Mr. Edison felt called upon to issue a public denunciation of the use of his name in connection with a fiction running in a New York evening journal and other papers, describing an attack from the earth on the planet Mars. But the story went on appearing all the same. Mr. Edison has always been known among the reporters as an "easy mark," he is so obliging and willing to help them satisfy, if possible, the orders of the city editor, but when his good nature is abused in this fashion he is likely to become less approachable, especially as the liar keeps shifting his energies from one subject to another. Only a week or two ago a story went around the papers circumstantially as to the remarkable qualities possessed by Mr. Edison's magnetic ore, and an English contemporary has just been sarcastic over it at Mr. Edison's expense. We are now informed that, as was suspected, it is another newspaper lie made out of whole cloth.

An equally flagrant case is that of Dr. Elisha Gray, so well known for his many electrical inventions and the organizing president of the International Electrical Congress of 1893. It has been given out with the fullest circumstantial detail that this distinguished man had gone all to pieces financially and was in the sorest straits. The public was invited to gloat over his agonizing struggles to keep the wolf from the door. Then as a fine touch it was added that he was dying of it all. The whole thing is a most outrageous lie. It is true that Dr. Gray suffered from the panic of 1893 and the prolonged depression, but that has not been an unusual or exceptional experience, and the doctor is not "stripped of everything," nor has he been cheated and swindled of every dollar, nor is he living in abject poverty, nor has he had to sell his art treasures, nor is he now taking boarders for a living.

The whole miserable story appears to have sprung out of a wish to boom some literary work that Dr. Gray had done upon invitation, for the newspapers, dealing with electrical questions in a series of articles. The "scare-head" way to interest the public was to write up, or rather "write down," the author, in a sensational and vulgar style, no matter how indignant he might be or how severely his friends' feelings might be hurt.—*The Electrical Engineer*.

**Bicycles in Ireland.**—Consul Swiney reports from Cork: The American bicycle—perhaps the most widely known and appreciated article of American manufacture—is making an invasion of the British markets and carrying almost everything before it. In this district the American bicycle has a special popularity. One sees more high-grade American wheels on the street than English makes. The public is beginning to fully understand the superior qualities, the great advantages of the United States machine—its lightness, strength and easy running.

A short time ago the impression prevailed that American wheels were too light for Irish roads, and that the wooden rims used were not suitable for the damp climate. It would now appear that the public is no longer of this opinion. Not only have the light American machines become popular and their lasting qualities and strength been proven, but British manufacturers have been compelled to build lighter machines to suit the public demand.

Another feature which is liked in American machines is the longer crank and higher gear. While the British machine has a 6-inch crank and 60-inch gear, the American has from that up to a 7 or 7¼ inch crank and 70 inch gear.



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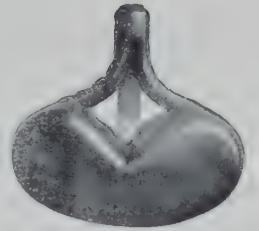


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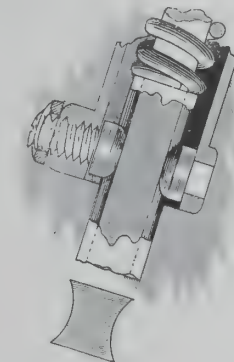
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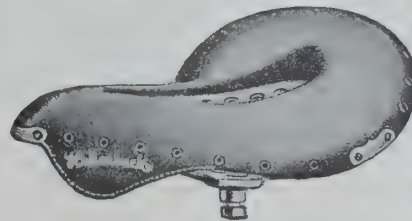
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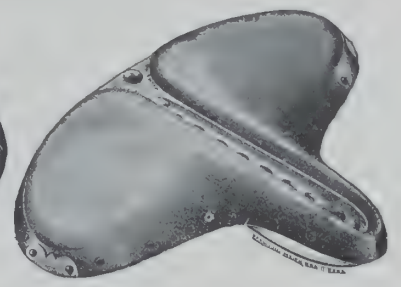
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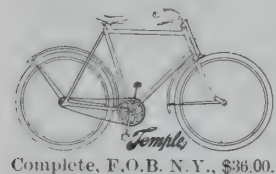
We also make a good Bicycle for \$21.60, for Ladies  
or Gents, with brake and guards, F. O. B. New York.

If you want Good Bicycles CHEAP

send your order to us. GOOD Bicycles cannot be  
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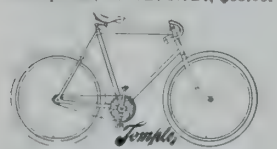
**TANDEMS and JUVENILE  
BICYCLES.**



Complete, F.O.B. N.Y., \$36.00.



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**RALPH TEMPLE CYCLE CO.,** 204  
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## EXPORT NEWS IN THE CONSULAR REPORTS.

## AMERICAN BICYCLES IN GERMANY.

I HAVE just seen and talked with the manager of one of the biggest and best bicycle factories in the Empire. He has just ordered some thousands of our guide pipes and wooden guards. Both, he says, are better than anything made here. German wood guards cost 1.45 marks. The American cost 1.05 marks; i. e., a batch bought in Berlin cost 1.05, but others ordered directly from New York parties cost only 85 pfennigs (20 cents) each. The same party is going to buy pedals in the United States. Made in his factory a pair of pedals cost 6 marks (\$1.43). He gets them from the United States, both rubber and rat-trap, delivered in Hamburg, for 4.50 marks (\$1.07). He wants to get chains like (naming a well-known American make). He says that is the very best chain he ever saw. He pays here 16½ pfennigs (3.9 cents) per link, 33½ per cent. off, or, for a 52-link chain, 5.71 marks, net (about \$1.36). So much for a few facts that I thought might be of interest.—*From report of J. C. Monaghan, U. S. Consul at CHEMNITZ, October 26, 1897.*

The bicycles of American manufacture have only been on sale in this city since the first of this year—mostly models of 1895 and 1896—but they have made deep inroads into public favor. The dealers prefer American-made wheels on account of their being more durable, lighter in weight and superior in finish.—*From report of Benj. Nusbaum, U. S. Consul at MUNICH, October 23, 1897.*

An interesting correspondence was published in the *Radmarkt*, an organ of the German cycle trade, between the Verein Deutscher Fahrrad Händler (Association of German Bicycle Dealers) and one of its members, a dealer in Hanover who, as it appears, had purchased a quantity of American cycles, which he advertised for sale at an exceptionally low price. Thereupon the association, inspired presumably by the Manufacturers' Union, attempted to call the dealer to account through an official letter, of which the following is a translation:

"We must absolutely protest against your offering American machines at (naming price), the trade in German bicycles being severely damaged by this action. You do not dare to say that an American wheel sold at such prices can be compared with a reliable German make. Therefore, if you do not cease advertising in this way we shall proceed against you in a proper way, first through the trade papers. We leave it to you to consider whether a first-class American wheel can be sold for — marks, and whether this is not sufficient ground for bringing you before the courts for violation of the unfair-competition law."

To this threat the dealer replied as follows:

"I am at a loss to understand your letter of January 7th. Nearly all the bicycle dealers whom you represent have American wheels besides their German makes. How can you, therefore, abuse American bicycles? I am buying my wheels where I can get them best and cheapest. We do not want to play blindman's bluff with each other. I beg to refer you to the following addresses (giving the names and addresses of several agents in Germany for well known American wheels). These are all excellent American makes that surpass the German-made wheels in every respect. As to the rest, I must deny you the right to interfere with my private business, as this undoubtedly falls under the unfair-competition act, your statement that 'first class American machines cannot be had at — marks' being an untruth."—*From the report of Frank H. Mason, U. S. Consul-General at FRANKFORT, February 26, 1898.*

## UNITED STATES SHOES IN GERMANY.

Consul-General Mason writes from Frankfort, under date of January 24, 1898, inclosing several very interesting letters regarding the outlook for American shoes in Germany. From one of these, written by a prominent shoe dealer in Berlin, we quote the following:

"BERLIN, January 19, 1898.

"SIR:—After having visited and personally examined, during a period of several months last year, a number of the largest shoe-manufacturing establishments in the United States, I decided to purchase and import for my own long-established trade, which is located in the busiest quarter of Berlin, a trial stock of several thousand marks' worth of American shoes. As I had foreseen, these have been promptly sold, down to the last pair; indeed, it soon became quite evident that my customers had already a decided preference for American shoes.

"From this experience I am convinced that it is possible to build up an important and permanent trade in American shoes.

"That the latter, by reason of their extreme elegance of form and perfection of finish, as well as their superior cheapness in comparison with German-made shoes, would find an extensive, profitable sale in Germany, there can be no reasonable doubt.

"After the highly successful experiment above described, I have repeatedly ordered further supplies of American shoes, and my own opinion as an experienced merchant, sustained by the uniform verdict of my customers, is that these shoes, in respect to durability, elegance of style and excellence of material have demonstrated that the standard American manufacturers can be safely advised to offer their products, under competent management, on a large scale in Germany.

"I can therefore only repeat and emphasize that my customers, who are of the most cultivated and intelligent class, have constantly and unanimously ex-

pressed to me their entire satisfaction with American shoes; and this fully justifies the conclusion that such goods will have a great future in Germany if only American manufacturers will organize their export trade to this country under proper conditions and push it with intelligent energy."

## UNITED STATES GOLF STICKS AND WOODENWARE IN ENGLAND.

Quite recently golf sticks made in the United States have been brought to England, and their arrival has aroused a great deal of comment. There is already a steadily growing trade in England for domestic woodenware of United States manufacture, and I particularly mention washing tubs and washboards. There is undoubtedly a great opening in this market for American manufactures of wooden articles of almost every description, including furniture, which is dearer here than in the United States. There is no doubt that most American articles manufactured from wood are both cheaper and better made than similar articles manufactured in England. The reasons are that most woods are cheaper in America, and improved machinery is used to a far greater extent in the manufacture than here. The appearance of American made golf sticks leads to the suggestion that the United States could even supply bats and wickets for the English national game of cricket cheaper and of better quality than the English made articles.

The following item is from the Liverpool *Echo* of February 1, 1898:

"Most people will be surprised at the statement that we are now importing golf clubs from America; but it is a fact, according to the statement of Mr. Charles S. Cox, an Englishman long resident in America, who, on his return home, has stated that he had no difficulty in obtaining orders for 8,000 clubs from the largest dealers of golf goods in Scotland and England. The reason for this is asserted to be that the American clubs are better made and better finished than those that can be obtained at home at anything like the same price. Mr. Cox says that the reason for this underselling is the improved machinery and advanced methods of manufacture which are used in America compared with our own."—*From report of James Boyle, U. S. Consul at LIVERPOOL, February 8, 1898.*

## Machinery and Labor.

IN *Donahoe's Magazine* for February an elaborate argument is given to show that machinery has enlarged the area of employment instead of reducing it. Labor-saving machines call for more and higher-priced labor. They may, and often do, work some hardship at first, but in the long run the effect is good for both employment seekers and their wages, adding numerically to the number of the profitably employed and to the wages. "Improvements in printing presses had a direct effect in extending the use of books and newspapers, and, therefore, in expanding the paper and printing industries. The development of railways, steam and electrical, in themselves, simply the substitution of travel and cartage by machine for the old methods by horse and foot, has given employment to thousands where hundreds were employed before.

"The invention of the typewriter has practically destroyed the profession of pen copyists, but many more persons now find employment through the widely extended use of the machine. The application of electricity in the telegraph and telephone, and in numerous other directions requiring complex mechanical appliances, has in recent years created industries that previously had no existence. Prior to 1880 the manufacture of electrical apparatus and appliances was not of sufficient importance to be separately presented in the census reports. In that year the average number of employees engaged in the industry was but 1,271, rising in 1890 to 8,802.

"The development of photo-lithography has almost superseded the old processes of block engraving, but in photography, photo-lithography and photo-engraving, as distinct branches, there were more than 8,000 persons employed at the date of the latest census."

Probably the most striking effect of improved and new machinery in creating demand for more and higher grade labor (and higher paid) will be found in the superseding of the wagon train by the railway train and the development of the iron and steel trades. In these employments fully 1,500,000 men work, whereas if the country were going on the basis of sixty years ago it could not pay one-quarter the number any sort of wages.

**A Wish Gratified.**—In view of the popularity gained abroad by American wheels during the last few years, and the fact that American makers are cutting into the trade of foreign riders, the following paragraph, taken from a report of the Stanley show printed in the now defunct English *Wheelman*, in 1883, is decidedly interesting.

"With regard to machines for the American market, one or two firms show such a specialty; but the only difference appears to be that they are slightly heavier than the English make. It would be a good thing if we could next year have the opportunity of inspecting the kind of article made on the other side of the pond. Perhaps we shall one of these days have to compete with American manufacturers. Who knows?"



**L. C. SMITH GUNS.** ALL BORED FOR  
NITRO POWDER.

Guaranteed never to shoot loose.  
8, 10, 12 and 16 Gauges.  
We use Whitworth Fluid Steel, Crown  
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Send for Catalogue.  
We now put Ejector Mechanism on all  
our different grades.

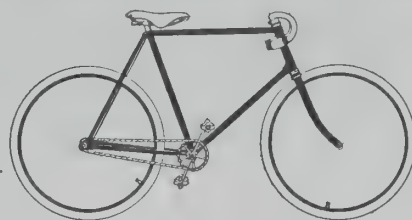
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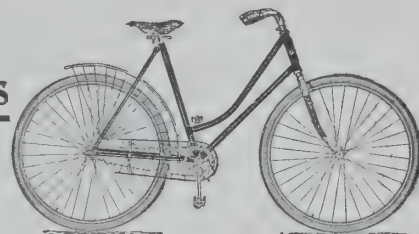
We also manufacture the CELEBRATED **"HUNTER" BICYCLES**

which are unsurpassed for  
**Beauty,  
Strength,  
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Easy Running Qualities.**  
These Bicycles embody all the latest im-  
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High-Class Bicycles for Export.  
We want Agents in every country.

WRITE FOR SPECIAL ILLUSTRATIONS AND QUOTATIONS.

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Bicycles and Tandems****THE SOUDAN MANUFACTURING COMPANY,**

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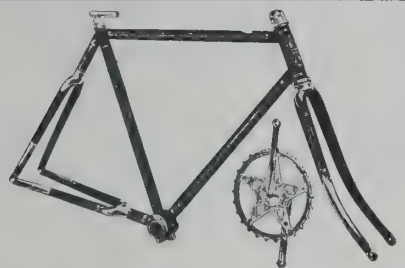
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In sending orders through export commission houses send us duplicate order.

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**"THE FINEST ON EARTH."**That's a broad claim to make for  
anything, but in the case of the**MANSON 3 CROWN**

MODEL 33

it's but the simple truth, and there is no  
need to deviate from the truth.**The Several Reasons Why?**

It is made of the very best  
material.  
It is new and novel and  
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It has two rear crowns to  
match the front fork  
crown, causing the ma-  
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at the hanger which fa-  
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of the chain without  
using the rear chain ad-  
justers, and is fitted with  
the one-piece Fauber  
crank.

The Thor Hubs are used  
and recognized every-  
where to be the best.  
The best swaged spokes,  
14x16 size, are used.  
Laminated or one-piece  
selected rock-elm rims,  
1 1/2 or 1 3/4, 28-inch wheels,  
drilled 32x36.  
The Peacock or Baldwin  
adjustable chain.  
Head set, turned from bar  
steel, drop forging con-  
nections.  
Seamless tubing through-  
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Dunlap tires.  
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bars.  
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Record pedals.  
Finest nickeling and enam-  
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a bicycle.  
Frames, 22 and 24 in. high.  
Weight complete, 24 lbs.  
Choice of gear.  
Ladies' frames are made  
same as gents, with ex-  
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20 and 22 inches.

THE PRICES—\$75 less 33 1/3 and 5 per cent., delivered f. o. b. New York.  
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Cable Address: "Manson."

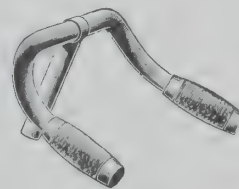
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Made 7-8 Tube Tops.

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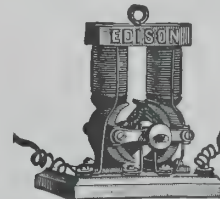
PRICES, WITHOUT GRIPS, F. O. B. NEW YORK.

Upturned, one doz. lots .....\$10.50  
Drop, one doz. lots..... 10.50  
Octagon Tube, extra, per doz..... 3.00  
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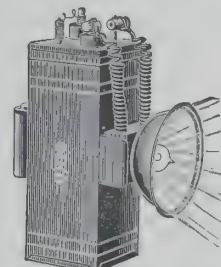
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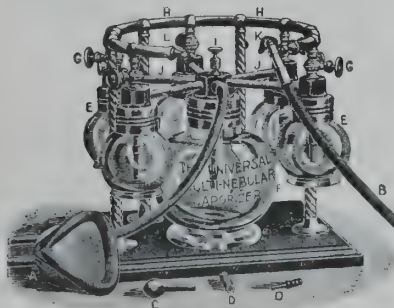
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Devoted to the Foreign Trade in Electrical Appliances.

## ELECTRICITY ON THE CENTRAL LONDON UNDERGROUND.

WE have, in recent issues of THE AMERICAN EXPORTER, referred more than once to the Central London Underground Railway, the most important of all the undertakings of this kind in the world. The following data concerning this road were furnished by Mr. H. F. Parshall to *Engineering*, and include such extensions and alterations as have been made since the original plans were made public:

The entire length of this new underground line is about five and one-fifth miles, and it will have ten stations between the two terminals. These stations are from 490 to 1,283 yards apart, and average about half a mile. At each station there will be batteries of large electric elevators to carry the passengers to and from the street. The train service will be carried on by thirty-two trains, each of seven cars, with a seating capacity for each train of 336 passengers. Trains are to run at first on a  $2\frac{1}{2}$  minute headway. The average speed of the trains is to be fourteen miles an hour, including twenty-second stops at each intermediary station. The maximum speed between stations will be thirty miles an hour. These speeds are about the same as are now made on our elevated roads.

In order to get these speeds with the smallest amount of power an interesting expedient has been resorted to in the construction of the tunnel. Instead of building it on a level or with constant grades from station to station, each of the separate tubes which carry the two tracks has been run through the earth in a series of dips. A train upon leaving a station will immediately start down an incline, so that gravity shall add to the acceleration of its speed, while at the other end of its run it will meet an up grade, which will stop it with little use of the brakes. Although each train without the locomotive will weigh 105 long tons, and with the locomotive 147 long tons, or about the same as one of our five-car elevated trains, the power which it is calculated that it will need to operate it over the dipping tracks will be only an average of about 100 horse-power.

This railway is of especial interest to our readers in view of the fact that the entire electrical equipment has been designed and manufactured in the United States.

The dimensions of the electric locomotives are given as follows: The wheel centres of the truck, 5 feet 8 inches and 6 feet; distance from centre to centre of trucks, 14 feet; number of driving wheels, 8; total number of wheels, 8; diameter of wheels, 3 feet 6 inches; total wheel-base, 20 feet 9 inches; total length of locomotive, 29 feet 8 inches; total height, 9 feet  $8\frac{1}{2}$  inches; weight on each wheel, about  $5\frac{1}{2}$  tons; total weight of locomotive, about 48 tons; drawbar pull, 14,000 pounds (6.2 tons); drawbar pull running at 22 miles per hour, 8,000 pounds (3.5 tons).

The weight of each locomotive will be about 45 tons. There will be four gearless motors on each, that is, one on each axle. The weight of the frame and coils of each motor, with field coils in place, will be 8,500 pounds, while the weight of the armature, complete with sleeve and conductor, will be 3,000 pounds, making a total weight for the motor of 11,500 pounds. The driver's cab is fixed in the centre of the locomotive, giving him a capital lookout both ahead and astern. In the space over the trucks are fixed resistance coils with a passage way between them, the whole being enclosed by a sheet-iron cover.

The hollow axis of the armature is slipped directly on to the axle, and occupies the whole of the space between the wheels. The whole motor, which has an armature 1 foot  $10\frac{1}{2}$  inches in diameter and four field coils, is inclosed in an iron case, access to the interior of which is obtained through a door. The efficiency of these motors is between 92 and 93 per cent. The temperature will not rise more than 90 degrees Fahrenheit on a two hours' run at full load. At starting the four motors are placed in parallel in pairs, and the two pairs in series. At the same time there is a resistance in series with each motor. Then one pair of motors is progressively shortened, and finally all four are placed in parallel. There are in all twenty-two stages in the regulation. Each section of the line comprises two inclines of 1 in 33, joined by a length on the flat, so that the train is greatly accelerated by gravity at starting, and retarded as it approaches a station. It is only by the combination of these circumstances and

by the aid of the powerful motors that the rapid services promised could be attained.

The current is conveyed to the locomotive by means of the third-rail system. The return current passes through the ordinary rails. The third rail is of steel, weighing 80 pounds to the yard, and is a channel section. It is supported on creosoted wood insulators, and the joints are bonded with short flexible crown bonds. The track rails are of bridge section, weighing 100 pounds to the yard, and laid on horizontal sleepers. Each joint has two bonds.

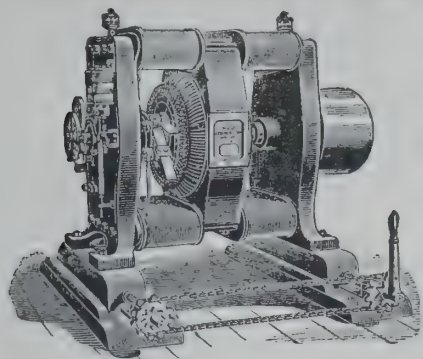
It might be of interest to give a few figures of the estimated passenger capacity of the line. It is said that with  $2\frac{1}{2}$ -minute trains, and all seats occupied, each person travelling the whole distance, about 85,000,000 passengers could be carried in the year; but as every one naturally would not go the whole distance, it has been estimated that 100,000,000 persons would be carried in twelve months; or, rather, that that number of passenger journeys could be made in the time. That may appear a very optimistic view to take of the prospects of the railway. On most suburban lines there is a rush in in the morning and a rush out in the evening, at both of which periods seats are at a premium; in the third-class carriages they have sometimes to be shared by double the orthodox number of persons. For the rest of the day, however, traffic is apt to languish, and one person to a compartment is not an unusual average, but in the streets of the central railway route there is traffic all day. Omnibuses and cabs are always going, and the former, if not always full, are generally tenanted. The Central London Railway, in virtue of its lifts and its continuous service of  $2\frac{1}{2}$  minutes, will be in many respects as convenient as an omnibus and far more rapid. The stations are so close together that passengers can hardly be landed at a great distance from their destination, supposing it to be on their line of route. Mr. Forbes, of the London, Chatham & Dover lines, estimated that there would be \$8,000 per mile per week for the local traffic on the Midland Railway. In 1866 Mr. Baker (now Sir Benjamin) gave \$4,030 to \$5,395 per mile per week as the percentage on the Metropolitan Railway between Paddington and Farringdon street. Between 1867 and 1890, however, the London population has increased 35 per cent., but the number of passengers in public conveyances has grown in much greater proportion, that is from 64,000,000 to 459,000,000. That is to say, the ratio of travel has increased twenty times as fast as the growth of population, taking the number of journeys only, irrespective of their length.

The engineers to the Central London Railway are Sir John Fowler, Sir Benjamin Baker and Mr. Basil Mott (who succeeded Mr. Greathead); Mr. Henry Tennant, late general manager of the Northeastern Railway, is chairman, and Mr. R. O. Graham, also an old Northeastern Railway man, is the secretary. The Electric Traction Company, of which Sir R. Farrant is chairman, has undertaken to construct and equip the line for a lump sum of a little over \$15,000,000, and contracts for the construction have been let to Messrs. Walter Scott & Co., Messrs. John Price & Co., and Mr. John Talbot.

## Double-Decked Trolley Cars.

DOUBLE-DECKED electric cars are now being experimented with on the lines of the Chicago General Railway Company and at Saratoga and Jamestown, N. Y., and it is announced that one of the latest type of these is to be sent to New York for trial soon. The new style of car is built under patents belonging to C. L. Pullman. The body of the car is of steel and trimmed with quartered oak sashes and moldings. The car is entered at the sides in the centre and the vestibule there is protected by folding gates which are entirely under the control of the conductor. The motorman has places partitioned off at the ends of the car on the upper deck, where he is separated from the passengers. Glass windows protect him from the weather. There is a trolley pole at each end of the car, and over the motorman's head are skylights which he can open when he needs to adjust the trolleys. The car is 35 feet 8 inches long and 7 feet  $11\frac{1}{2}$  inches wide, and seats thirty-six persons on the lower deck and forty-four on the upper. The upper deck has removable sashes, so that for warm weather it can be left all open. No bell cords are used. The passengers communicate with the conductor by pressing electric buttons and thus ringing an electric bell. The conductor gives his signals to the motorman by a separate electric wire. The car is driven by four electric motors, each of 40 horse power, and is provided with both hand and air brakes. The compressed air for the air brakes is furnished by an electric motor driven by a current from the trolley line, and the car has thirty incandescent electric lights. The car weighs about 20,000 pounds, which is just about the same as the weight of the long cars now in use in Brooklyn. Each car costs about \$3,000, as against \$1,700 for the ordinary 34-foot single car which seats thirty-six persons.





## FORT WAYNE ELECTRIC CORPORATION,

Foreign Dept.: 115 Broadway, New York, U. S. A.

Factory: Fort Wayne, Ind., U. S. A.

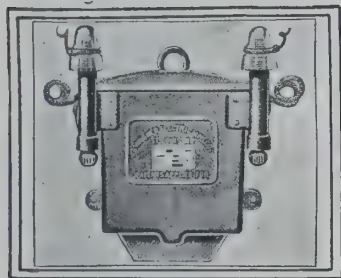
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"WOOD" SYSTEMS

Of Arc, Direct Current and Alternating Incandescent Lighting, and Power Transmission.

Estimates furnished on receipt of specifications.



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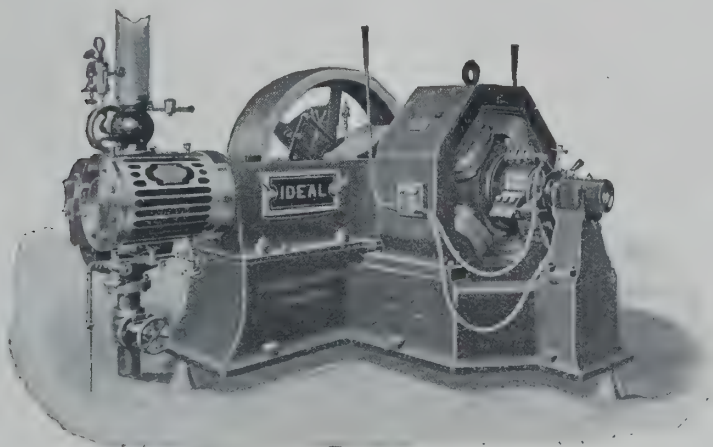
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Direct Current Transmission from Water Power.



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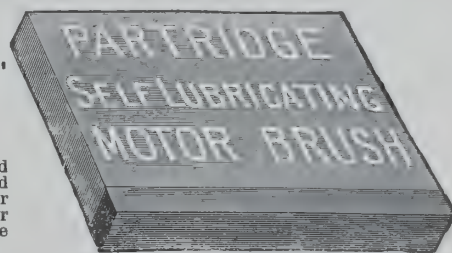
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These Carbons are for Generators and Motors of all kinds. Specially adapted for Fan Motors and Electric Street Car Work. In ordering through supply or commission houses send us duplicate order.



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We desire to call attention to a line of **cheap** but excellent Switchboard Instruments for Direct Current Circuits, which we designate as

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These instruments are particularly suitable for Isolated Plants and Feeder Circuits in Railway and Power Plants. Voltmeters in ranges from 3 to 750 volts, Ammeters in ranges from 1 to 2,500 amp. All Weston Instruments are unsurpassed in excellence of workmanship, in accuracy and economy of

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Every family should possess an Edison Phonograph for home entertainment. It talks to you, sings for you, laughs for you and entertains you as nothing else can.

Home Phonograph outfit complete, for family use, with 10 records, 3 blank cylinders, parlor horn, hearing tube for 3 persons, 15 peg box and instructions, \$39.00.

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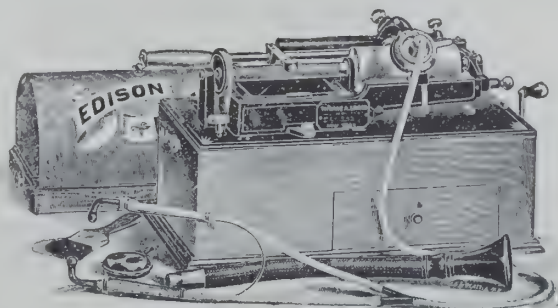
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### To Build American Steamers.

THE New York *Journal of Commerce* reports the incorporation of the American Mail Steamship Company. The company has an authorized capital of \$1,000,000, and is chartered to do a general steamship business as well as own steamers. Mr. R. A. C. Smith, the president, when questioned about the new company, made the following statement:

"During President Harrison's administration, in conformity with recommendations made by him in a message to Congress concerning the necessity of extending American commerce and having available for use as an auxiliary arm of the Navy vessels of high speed and modern construction in case of necessity, a bill was passed and approved in March, 1891, by the terms of which certain privileges were granted to American built ships of the type named.

"During the remaining year of President Harrison's administration no advantage was taken of the provisions of the act in question, and during the succeeding four years of President Cleveland's term the matter was entirely neglected.

"With the incoming of the McKinley administration the National Association of Manufacturers, which held a convention within the last few weeks in this city, called attention to the necessity of extending American commerce under laws already in existence, and the outcome of this recommendation has been the organization of the American Mail Steamship Company, which proposes to build four new high speed twin-screw steel vessels of sufficient strength and stability to carry and sustain the working operation of at least four effective rifle cannon of a calibre not to exceed six inches.

"The vessels are to be of the highest rating known to maritime commerce, and are to develop a speed of at least 15 knots per hour at sea under ordinary conditions of weather. These vessels are to take as cadets or apprentices American-born boys under 21 years of age, they are to be officered by Americans, and one quarter of the men upon them are to be American born citizens.

"Some idea of the character of the vessels which the American Mail Steamship Company propose to build may be gathered from the fact that they are to be over 2,000 tons burden, at least 280 feet long and 36 feet beam. The weight of a six-inch gun is 10,770 pounds, the gun carriage 6,300 pounds, the shield 7,800 pounds and the circle 2,515 pounds.

"The owners do not expect to have any difficulty in chartering these vessels, as they will be faster and safer than the hundreds of foreign 'tramps' now chartered by Americans in their carrying trade. This is believed by its organizers to be the first step in the development of a new American merchant marine."

The new company made the only bid for the contract under the Subsidy act for carrying the mail between Philadelphia and Boston or New York and the Port of San Antonio, Jamaica, for periods of five and ten years.

The service required by the contract is from Boston to Port San Antonio twice a week, from April 1st to September 30th inclusive, and once a week from October 1st to March 31st inclusive; from Philadelphia to Port San Antonio once a week from October 1st to March 31st inclusive, in vessels of the fourth class. The right was reserved to the department to substitute New York for Philadelphia as one of the terminal points from October 1st to March 31st.

This company submitted two separate proposals containing the same provisions, except as to time, the terms being five and ten years respectively. It proposed to furnish four new American built iron and steel twin screw vessels, of 2,000 tons and over, to make 14 knots per hour, at a compensation of 66½ cents per statute mile. The bid was taken under consideration by General Gary, and his decision will be announced soon.

### American Locomotives.

THE first successful steam locomotive constructed in this country was a small model designed and built by Peter Cooper and first operated on the Baltimore and Ohio Railroad in the year 1829. This was followed by the "Best Friend," built by the West Point Foundry Company in 1831. The "Best Friend" was the first locomotive built in this country for actual service, Cooper's engine having been more in the nature of an experiment. In the same year the West Point Company built the "South Carolina" for the South Carolina Railroad Company.

In 1832 M. W. Baldwin, of Philadelphia, completed "Old Ironsides," the first locomotive built in Philadelphia. This was first put in operation on the Philadelphia, Germantown and Norristown Railroad on November 23, 1832. Thereafter on pleasant days the cars of this road were drawn by this new engine for a number of years. On rainy days, however, the engine was carefully kept

under cover, the cars being drawn on the regular trips by horses. "Old Ironsides" weighed a little over five tons when in running order. The wheels were made with cast iron hubs, wooden spokes and rims and wrought iron tires. This engine attained a speed of thirty miles an hour and created great wonder among all who saw it. From such small beginnings has sprung up one of the greatest industries of the country. The rapid growth of the railroads in America has created a large demand for locomotives of almost endless variety and design. Not only has this demand been promptly met by the locomotive plants of our country, but these plants have developed a large export trade as well.

According to the last census report there were in the United States twenty establishments prepared to manufacture locomotives, of which nineteen were in operation during the year 1890. This does not include the shops of railroad companies engaged in the manufacture and repairing of locomotives. Of the 2,409 locomotives built in 1890, 1,215, or over 50 per cent. of the whole number, were made by two establishments, while six other establishments produced 834 locomotives, making a total of 2,049 locomotives, or 85.06 per cent. of the total production turned out by these eight plants.

The largest locomotive works in this country have been in continuous operation for sixty-five years and in that time have constructed over 15,000 locomotives.

In the year 1894 the total number of locomotives in the United States, Mexico and Canada was reported to be 35,813. The average life of a locomotive is about twenty years, so that an annual production of 1,800 will supply the demand of natural wear. As the capacity of the various plants of the country aside from those operated by railroads is 3,000, it will be seen that there is left a wide margin to fill the requirements of increasing traffic and a growing export trade.

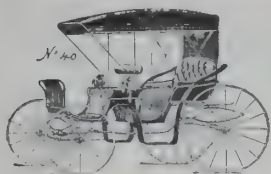
The Philadelphia *Record* takes pride in narrating the following instance of what American locomotive manufacturers can do. It says: "A feat unique in locomotive building in order to meet the necessities of war has just been accomplished at locomotive works in Philadelphia. An extraordinary effort had to be made to turn out four engines for the British government's imperative requirements in the quicker movements of troops, provisions and munitions of war over the Soudan Railway in Lower Egypt. No European locomotive works could approximate the speed required. So some American builders were asked what they could do in the emergency. They could build the locomotives in less than half the time, they said, that had been indicated as England's best. They got the contract, and they actually have constructed the engines in 31 days, or less than one-fourth the time that any concern east of the Atlantic would have required. It is an object lesson to all the world as to what the United States can do in the way of hustling when an emergency necessitates it."

### American Packing in Victoria.

THE United States packing is generally superior to the British. Large quantities of small articles, which in Great Britain would be put in paper parcels, are in America contained in cardboard boxes, and even when such goods are boxed in Great Britain, the boxes are neither so sightly nor so strong as the American. In looking round the shelves of hardware stores the British boxes can be picked out by their want of style and the greater number of broken corners. The United States has, undoubtedly, pushed forward its trade in hardware largely by the excellence of the get-up of the goods. They prepare them in such a way that they look well on the shelves of the store of a retailer, which is a matter of importance. As they are generally packed on the shelves with the ends outwards, the Americans put a description of the goods on the ends, as well as on the tops or sides. The Americans also put the importer to less expense for outside packing. The cases they use are cheaper and lighter; they are rougher than British, but as effective, and the system of lining with prepared paper instead of with sheet metal is generally approved. It is the experience of importers that the goods arrive here from America as free from damage as from London, notwithstanding the fact that they have to bear a long sea voyage by sailing ship. American cases are generally smaller than British; this is an advantage in itself. In many instances the cases are specially designed for trade purpose, that is, the correct quantity to form a unit of a salable quantity is put in one package. The British exporter has not to any great extent adopted this useful idea.—*The British Trade Journal*.

**Shipment of Locomotives.**—One American firm recently shipped twenty locomotives for the Imperial Government railways of Japan, twelve for the Kiushiu Railway and four for the Seoul-Chemulpo Railway of Korea. These latter are the first engines ever sent to Korea and are for the first railroad built in that country.



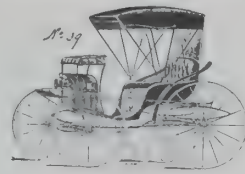


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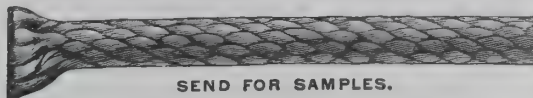
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Send for complete Catalogue.  
In ordering through export houses send us duplicate order.

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SEND FOR SAMPLES.

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SAMSON BRAND

SAMSON CORDAGE WORKS. - - Boston, Mass., U. S. A.

Patented  
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## THE WIRE FLY KILLER.

UNIVERSALLY USED ALL  
OVER THE WORLD.Unsurpassed in houses, Stores, Etc. Does not crush the fly.  
Does not soil the most delicate wall paper or ceiling.

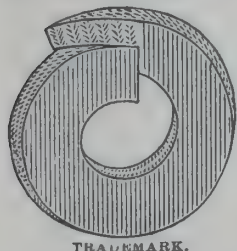
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J. F. BIGELOW, Manufacturer and Exporter,

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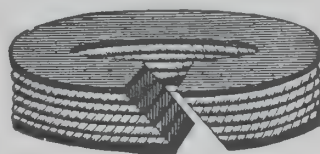
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Patented June 1, 1880.—The Original Ring Packing.

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SELF-LUBRICATING, STEAM AND WATER TIGHT.Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. EVERY  
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ORIGINAL RING PACKING.



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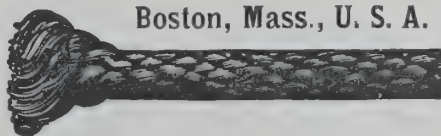
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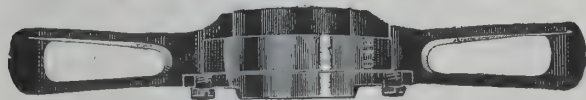
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THE BEST IS THE CHEAPEST.

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MANUFACTURERS OF

Edge Planes, Heel Shaves,  
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Knives for Machines made to order.

## FINE SHOE TOOLS

FOR EXPORT TRADE.



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### The Original Fireproofing and Waterproof Paint.

When combined with cold water makes the finest paint on earth. Especially adapted for out-buildings, private residences, factories, breweries, tanneries, stables, fences and cellars. Its fireproofing and waterproof qualities make it especially valuable for manufacturing establishments and large buildings of every description. Comes in powder form, in white and colors. Orders filled through commission houses. Send for color card, free sample and catalogue "1." Goods sold under absolute guarantee not to peel, crack or wash off. In ordering specify whether wanted for inside or outside use.

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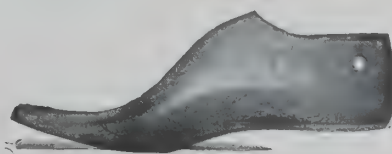
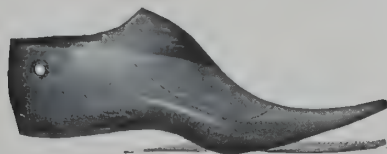
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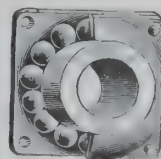
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Special attention given to export  
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### New Catalogues and Trade Publications.

*These catalogues may be had free of charge on application to the firms issuing them. Please mention THE AMERICAN EXPORTER when you write.*

THE PELTON WATER WHEEL COMPANY, 121-123 Main street, San Francisco, Cal., U. S. A. This large catalogue, 98 pages, contains elaborate descriptions of the Pelton system of water wheels and water motors, together with riveted steel pipe, valves, belting and all kinds of power transmitting machinery, with price lists. A notable feature of the catalogue is the number of accounts than it contains of plants where these wheels or motors are in successful operation, including a large number of electric-power installations. The directions and explanations given are unusually clear and elaborate, particularly those informing correspondents how to ascertain the necessary data, regarding the amount of water power available, head, etc. Illustrated and contains a full telegraphic and cable code.

THE BIGNALL & KEELER MANUFACTURING COMPANY, Edwardsville, Ill., U. S. A. Descriptive catalogue and price list of pipe threading and cutting machines, vises, screw punches, shapers, emery surfacers, ratchet drills, universal chucks and a variety of special tools and machinery. Contains an index, many pages of tables and other matter of interest to mechanical engineers. Illustrated.

WOLVERINE MOTOR WORKS, Grand Rapids, Mich., U. S. A. Illustrated catalogue of marine and stationary gas and gasoline engines, plantation locomotives, etc., and a great variety of single, twin-screw and stern-wheel launches.

IRA F. WHITE & SONS, 76-78 Park place, New York, N. Y., U. S. A. Illustrated price list of steel halter chains and snaps, dog collars and chains and other chain specialties, steel rakes, extension step ladders, etc.

THE PARTRIDGE CARBON COMPANY, Sandusky, Ohio, U. S. A. Price list of carbon brushes for all standard motors, generators and dynamos, together with special sizes and pure plumbago generator brushes.

J. A. FAY & Co., Front, John, Water and Smith streets, Cincinnati, Ohio, U. S. A., have sent us a large poster containing illustrations of a great number of their wood-working machines, the place of honor being given to a mammoth sand-papering machine.

### Shoes by Machinery.

IN no other branch of manufacturing has labor-saving machinery made more rapid strides than in the making of shoes. So perfect and complete are the different machines used in the trade that now a full set may be bought that will turn out finished shoes on which the hand labor has been confined to one part, that of cutting the uppers. In completing different parts of the shoes, such as sewing the sole or trimming the edges, work that at one time was all done by hand, one man can handle on one machine 500 to 600 pairs a day.

The first and most important introduction of machinery into the manufacture of shoes was that of the sole-sewing machine. This is largely sold and used to day, but while it once stood alone, it is now surrounded by machines to do all manner of things thought impossible to accomplish by such methods a few years ago. There is the lasting machine, which "pulls the upper over and tacks it," while three different machines are made to attach the outer sole to the upper. The sole-sewing machine puts on what in cheap shoes are called hand-sewed soles; and, indeed, the sole is sewed to closely resemble hand-sewed work. The rounding machine rounds off the soles of the partly finished shoes at the rate of 500 or more pairs a day, while the edge trimmer, heel trimmer, edge setter and bottom burnisher each works as rapidly, requiring but one man to the machine. Each of these machines does work that required many hands prior to their use. The work of the rounding machine was carefully and laboriously done by a man with a sharp knife, and the number of soles he could round in a day was limited, indeed.

While each individual sole was at one time pounded by hand after being soaked, they are now run through rollers in an endless stream, coming out compressed and hard to the desired degree. Lasting machines do the work of many hands. Although these machines have been in use for several years, there is still some hand lasting done. Shaping the bottom of the finished shoe is done by one motion of a heavy machine, formerly the work of many hammer blows. The latest devices in the line of attachments for shoe manufacturing machines, are wheels and stiff, revolving brushes for finishing the bottoms of shoes. Any desired finish or polish can be given to the under part of the bottoms. Inventive genius has not been satisfied with turning out perfect and highly finished shoes at the rate of 500 or 600 a day to each machine. It has found that the finished

shoe, to be altogether perfect, must be dusted and the grease wiped off. For this purpose textile brushes were brought into use with such good effect that each shoe, when it is sent along to be wrapped in paper, is as nicely cleaned as if done by hand.

### Brooklyn Bridge Trolley Register.

THE electrical device for counting the number of trolley cars that cross the Brooklyn Bridge in connection with the through transit scheme has been completed by Electrical Engineer C. B. Martin. Under the terms of the contract made by the old board of bridge trustees a toll of 5 cents is to be paid for every trolley car that makes the round trip on the bridge and 12 cents for every elevated car.

The device is one that cannot possibly be beaten by the trolleys, and Mr. Martin is confident that every car crossing the bridge will be recorded. Two of these instruments will be used, one on each roadway, in front of the toll collector. While it is expected that the instrument will record correctly, a three months' trial will be made before it is adopted, and during this period each instrument will be a check on the other, and, in addition, a count will be made by men stationed on the bridge for this purpose. According to the present programme the trolley roads expect to operate cars to the number of 3,000 to 5,000 trips per day. This will give the bridge a revenue of between \$150 and \$250 per day. The elevated cars, when they finally succeed in completing preparations, are expected to run over the bridge daily to the extent of 2,000 single car trips, or a daily bridge revenue, at 12 cents per car, of \$240. The yearly revenue of the bridge from all tolls from cars, it is estimated, will be in the neighborhood of \$150,000.

The electrical counting device for trolley cars is primarily based on the use of a series magnet introduced in a special feed wire to an insulated section of the regular trolley wire.

This insulated section is 60 feet long and is supplied from the main feeder by a wire which is coiled into a solenoid. This solenoid operates the arm of the counter every time current is taken by a car passing this 60 foot section. The counter consists of a series of cogwheels which move forward one inch, and this shows that one car has passed over the bridge and one 5 cent toll is due from the railroads. By a connection with the first counter the cogwheels in the second counter situated in the main office are set in motion at the same time, and in this way two records are kept by each instrument of every car that passes this point. One counter of each instrument will be placed in the roadway, and probably in the toll collector's box, where he can instantly see that it registers every car that passes him.

### Electric Power for Machine Shops.

NO more remarkable expansion of the use of electricity has ever been witnessed than its application, during the past three or four years, to the driving of tools in machine shops. We are all too sadly familiar with the treatises and articles published six or seven years ago by the so-called friends of electrical development, in which they showed how tools could be so driven and in which they proclaimed the enormous advantages of electricity in such cases over every other form of motive power. The writers of these articles would to-day, if they were candid, frankly acknowledge that they inspired business men with a profound distrust of electricity as a motive power, because when these business men began to go into details, after their fashion, they found that the current was, at that time, much more expensive than direct steam or regular belting, while those of them who actually installed plants with electric motors found that the motors had an unfortunate habit of breaking down at the most unexpected and embarrassing times. In a word, the time was not ripe.

Since then, however, the vast extension of the trolley system and the consequent experience which it entailed, directly and indirectly, on manufacturers of electric motors everywhere, have made it possible to build motors of any size, which, with an economical output at a given load, will stand occasional or frequent overloads with impunity. To-day the number of firms throughout the whole United States which are daily replacing belted plants, in whole or in part, with electric motors, is steadily increasing. In another year or two, when the present unorganized struggle for precedence in such work will have settled down, it will be found that electricity has become as indispensable in the machine shop as it now is in the lighting and suburban transportation fields. Indeed, as electric lighting plants increase, so will the tendency to run small shops by electricity grow, because the lighting companies will ask nothing better than to sell power during hours when the greater part of their plant would otherwise be lying idle.—E. H. Mullin in *Cassier's Magazine* for January.





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MANUFACTURERS AND EXPORTERS OF

## Whiting's "Ratchet-Action" Wrenches.

Sold direct or through export commission houses.  
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### NASHUA SADDLERY HARDWARE COMPANY,

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Harness Saddle Trees (in iron), Gig, Track, Coupe, Express. All styles and sizes.

Harness Saddle Mountings, such as Terrets, Check Hooks, Etc., Etc. All Patterns.

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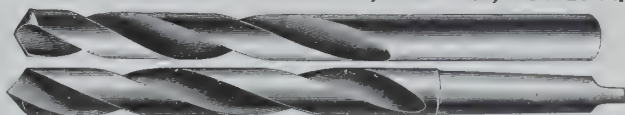
## STRANGE FORGED DRILL AND TOOL COMPANY,

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**Forged Twist Drills**  
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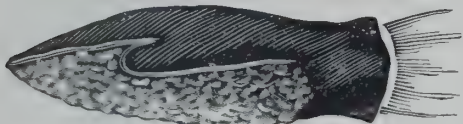


Also Chucks, Rose Reamers and Machinists' Tools.

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THE HANDY.



TRADEMARK.

## SHEEP SKIN MITTEN,

Acknowledged to be the best article for **POLISHING STOVES**, as it does away with the old-time dirtiness of the work, making this work a pleasure. Also invaluable for polishing brass or glass, or silverware which it does not scratch. For tan shoes and cleaning bicycles it has demonstrated itself a conspicuous success.

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**DIAMOND HARDWARE CO.**

Steel Door Mats,  
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Bank and Office Railings,  
Elevator Cars and Enclosures,  
and Wire Goods of  
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used in all Bicycle Stores, Public Buildings, Business Offices, Factories, Stores, Depots, Schools, Churches, Private Dwellings, Etc. Catalogue "S" on application.

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ESTABLISHED 1834.



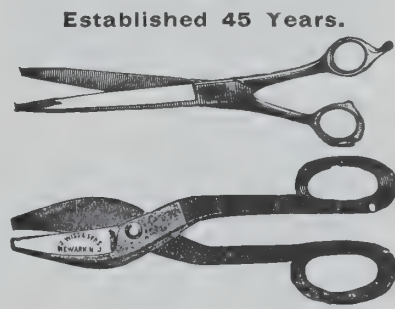
They Adjust to any angle, but when set are firm.



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Manufacture the Largest Assortment of ONLY THE  
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**Shears AND Scissors,**  
STRAIGHT AND BENT TRIMMERS,  
TAILOR SHEARS, BARBERS' SHEARS, TIN OR METAL  
SNIPS, PRUNING SHEARS, LADIES' SCISSORS,  
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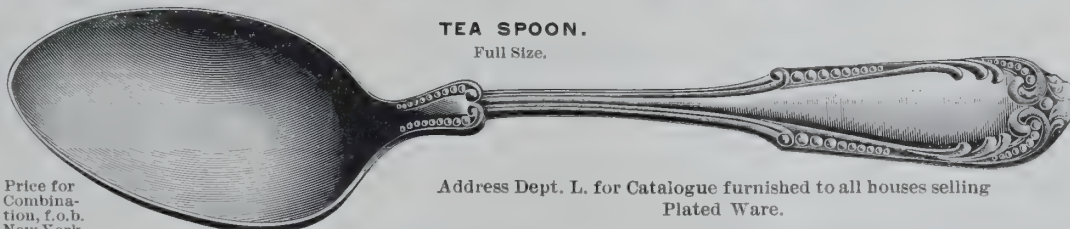
is the most pleasing design in Spoons and Forks yet produced. The wearing qualities of the Spoon are unsurpassed. Send order for

Combination No. 53,  
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6 doz. Unique Tea Spoons, XIV Plate, Extra Sectional.  
3 doz. Unique Table Spoons, XIV Plate, Extra Sectional.  
3 doz. Unique Medium Forks, XIV Plate, Extra Sectional.  
6 doz. Unique Round End Medium Knives, 12 dwt.

Price for Combination, f.o.b. New York,

**\$47.50.**



TEA SPOON.

Full Size.

Address Dept. L. for Catalogue furnished to all houses selling Plated Ware.

**THE HOLMES & EDWARDS SILVER CO., East Bridgeport, Conn., U. S. A.**

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The following articles for table use are made in the UNIQUE pattern:

Tea Spoons,  
Table Spoons,  
Dessert Spoons,  
Dessert and  
Table Forks,  
Coffee Spoons,  
Fruit Forks,  
Sugar Shells,  
Butter Knives,  
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The Leading House.

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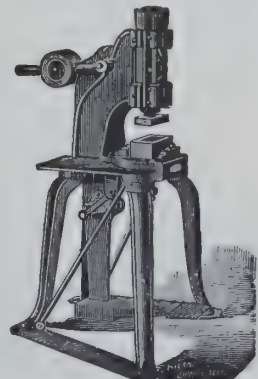
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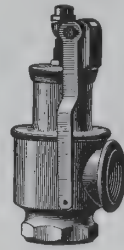
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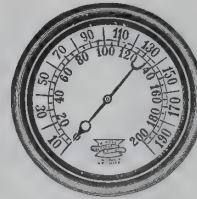
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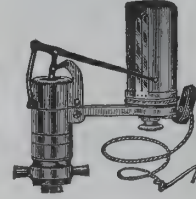
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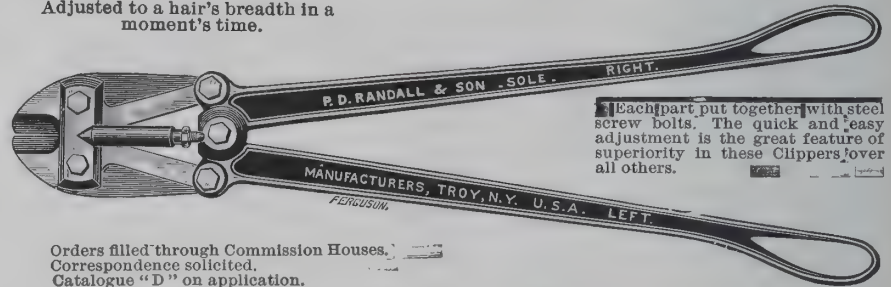
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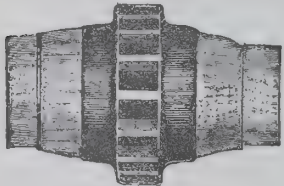
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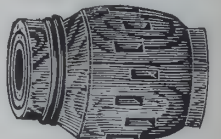
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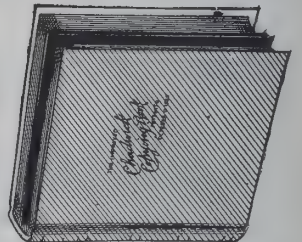
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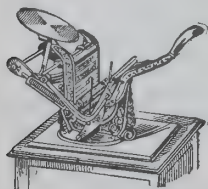
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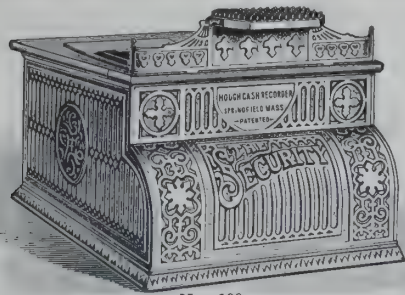


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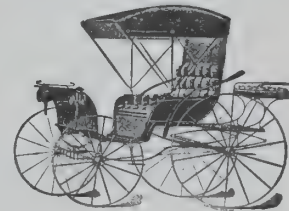
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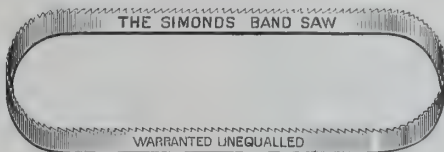


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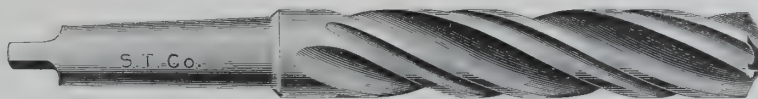
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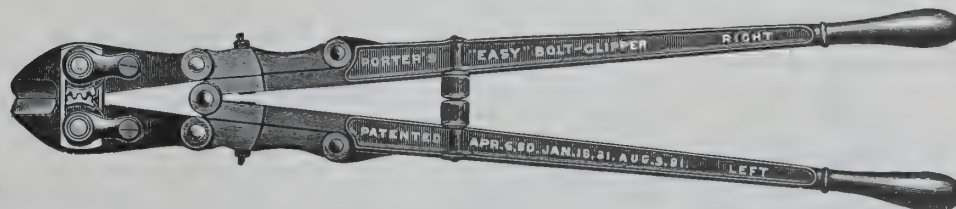
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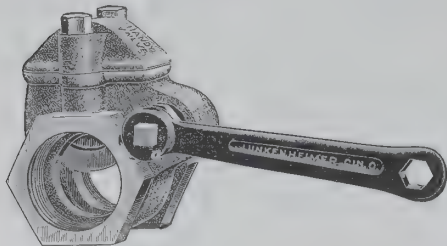
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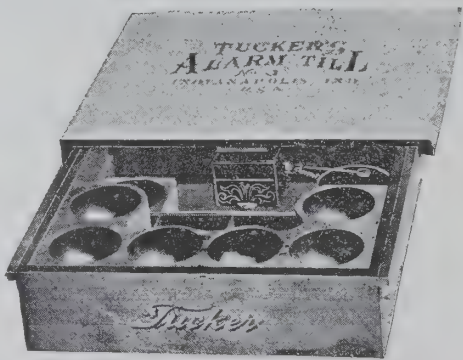
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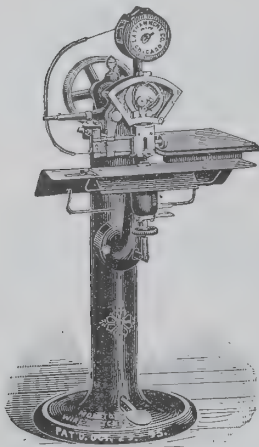
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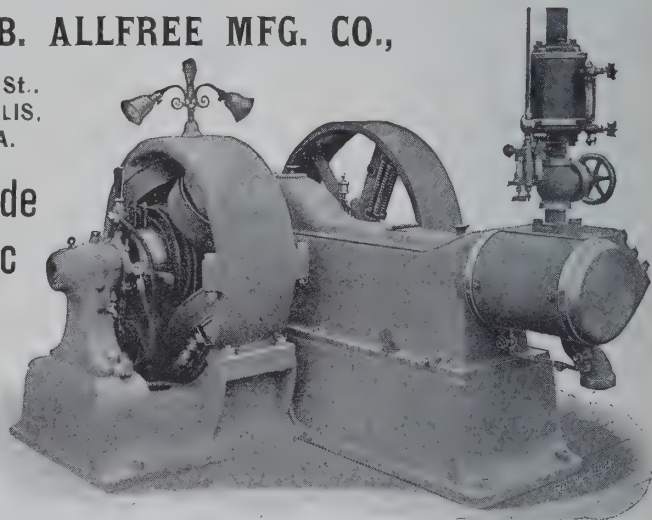
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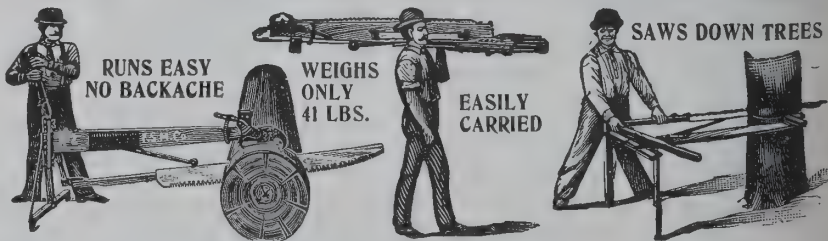
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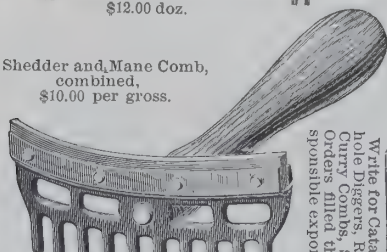
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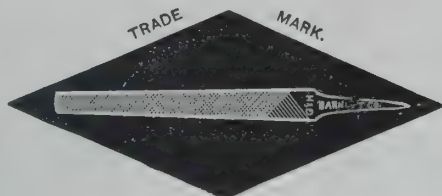
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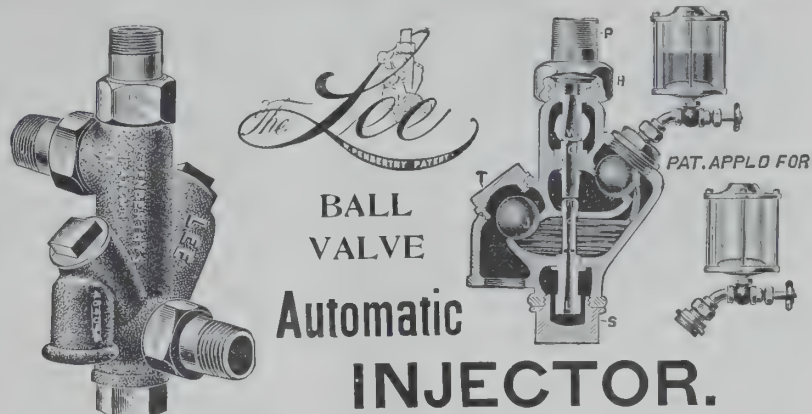
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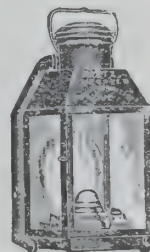
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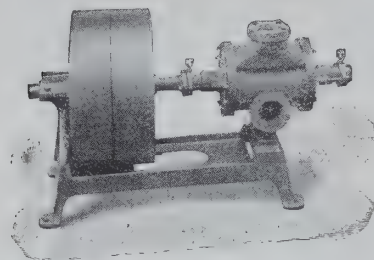
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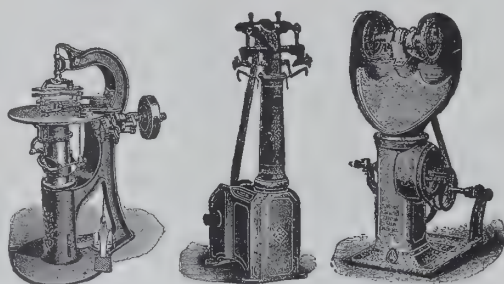
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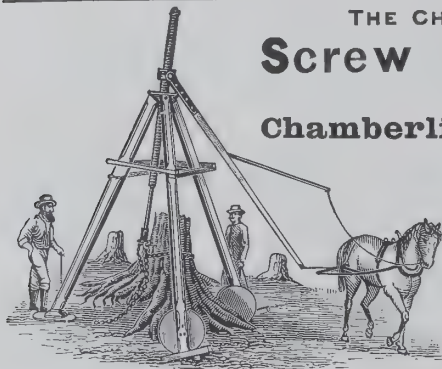
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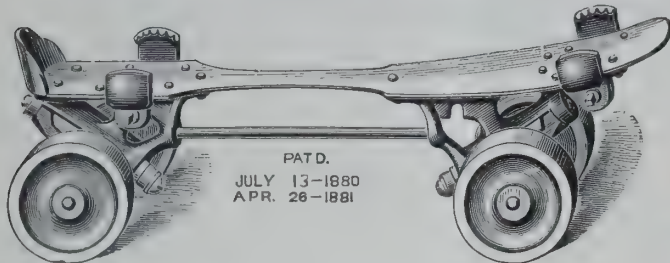
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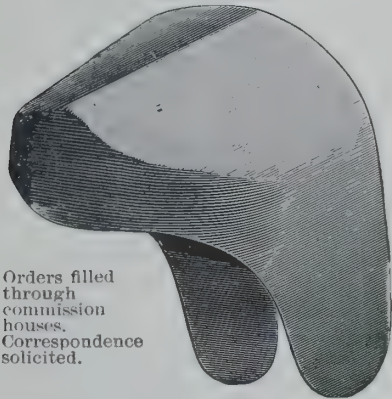
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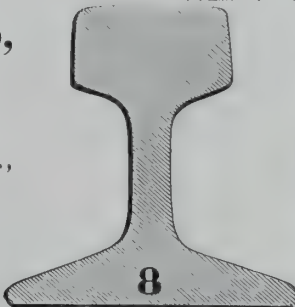
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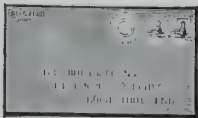
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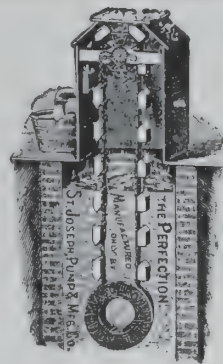
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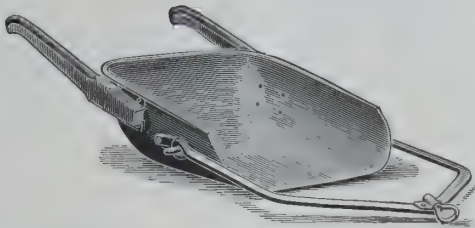


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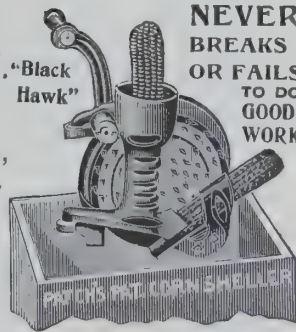
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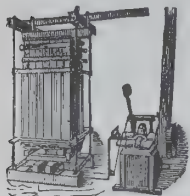
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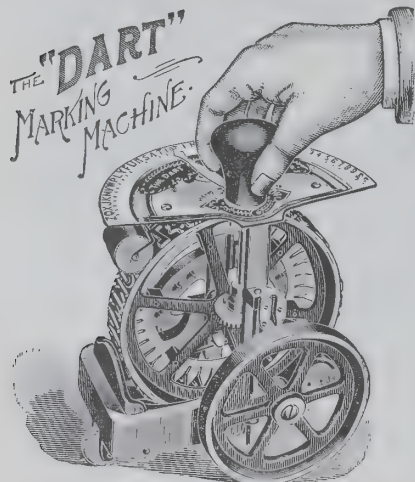
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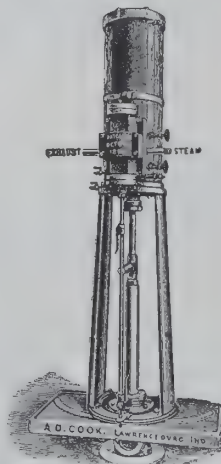
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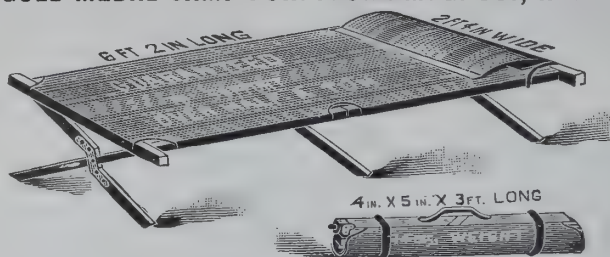
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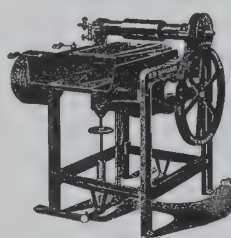
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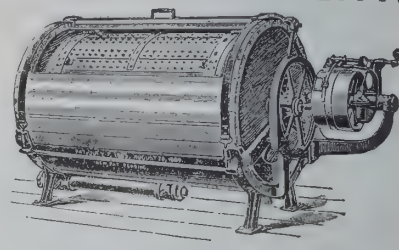
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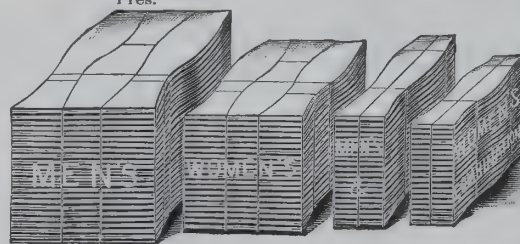
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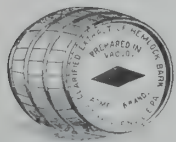
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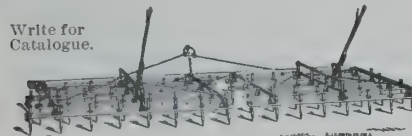
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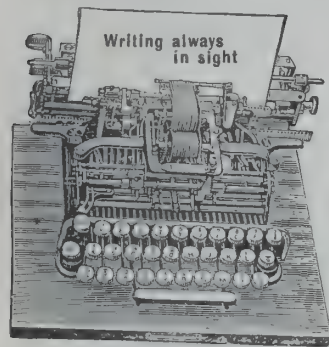
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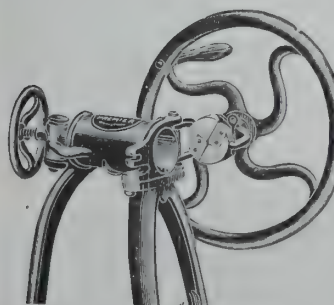
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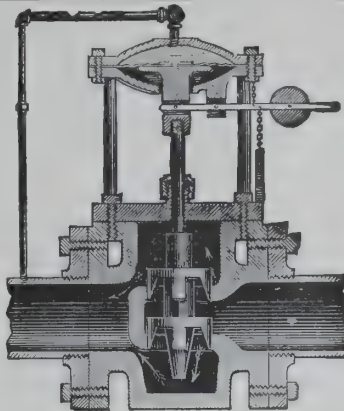
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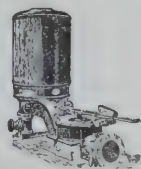
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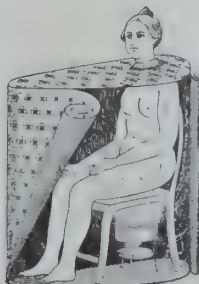
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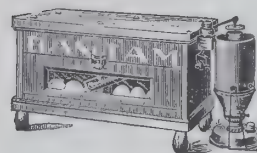
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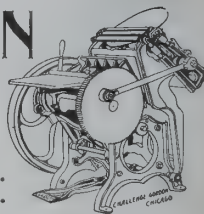
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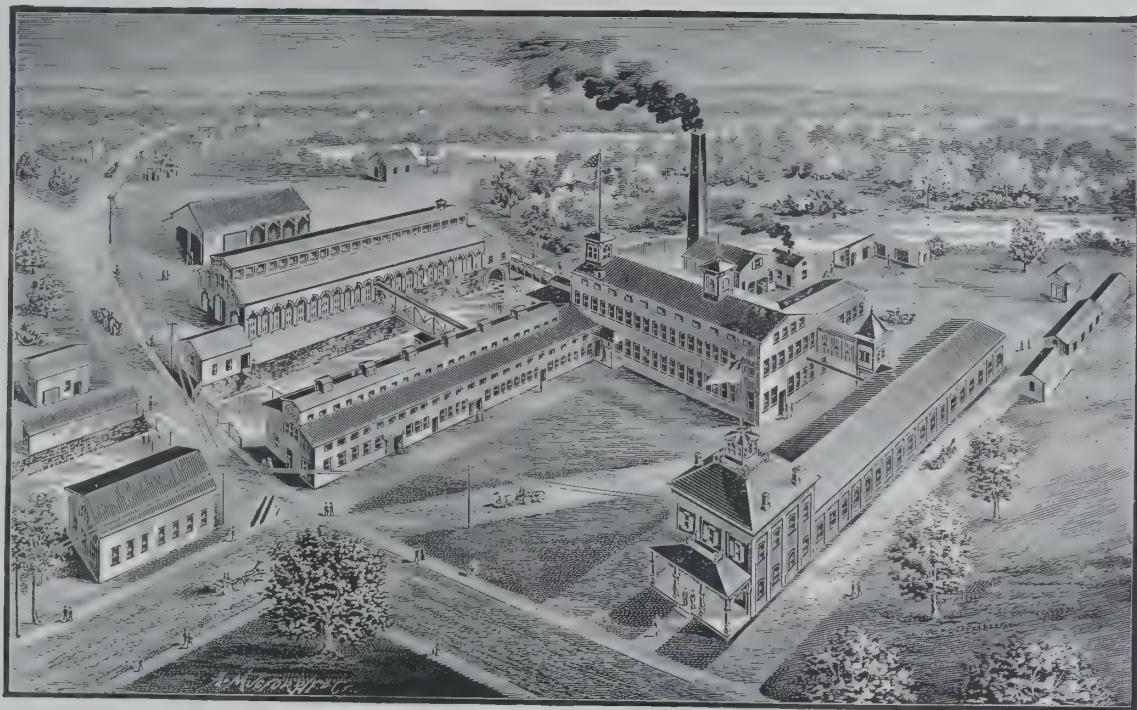


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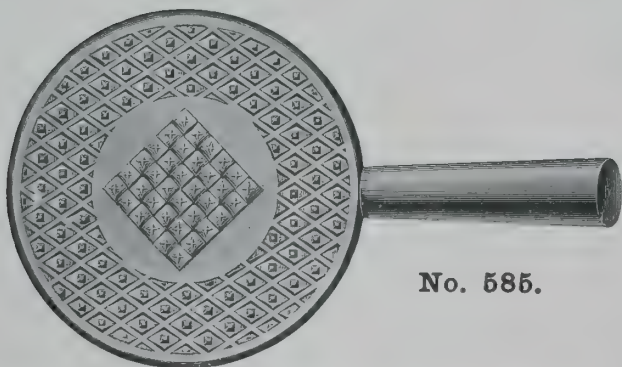
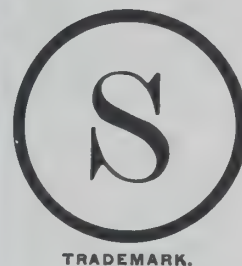
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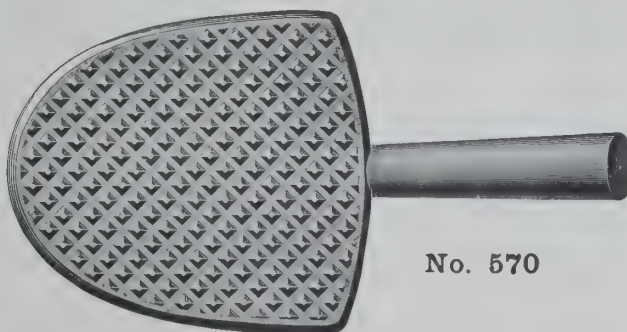
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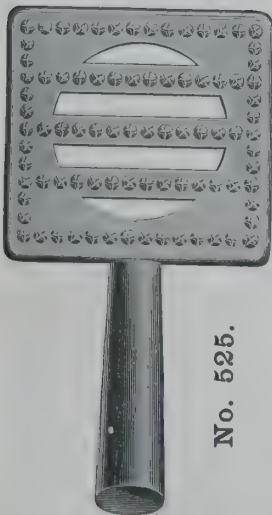
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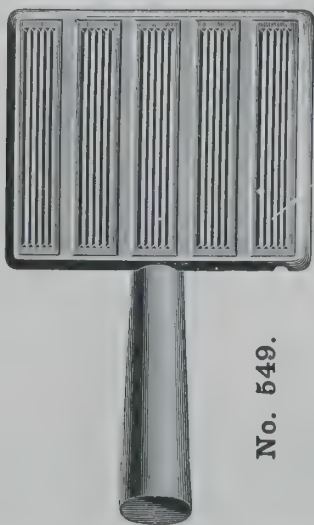
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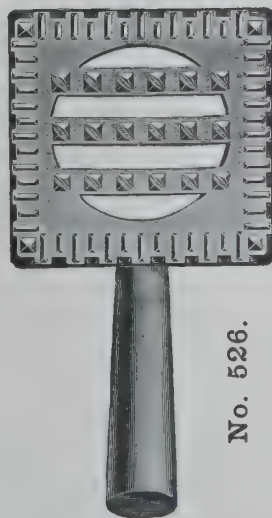
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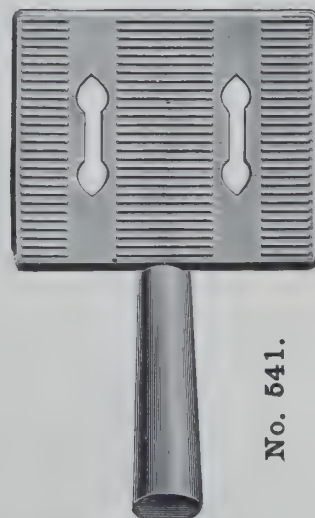
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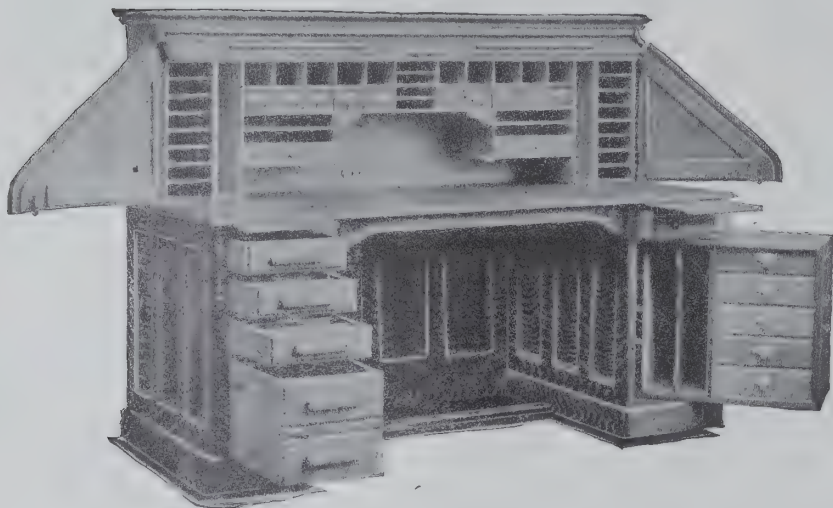


# DESKS!

# DESKS!!

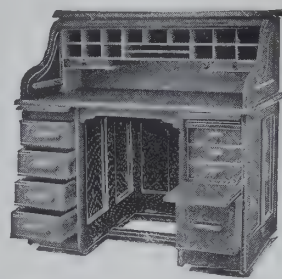
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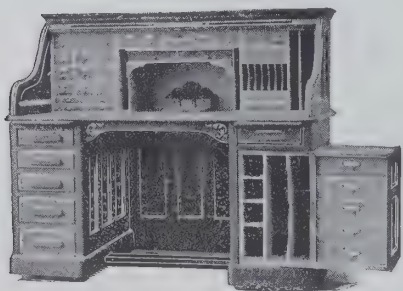
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NO. P. 243, STYLE "B."

**\$17.00** buys this desk exactly as illustrated. It is made of quarter-sawed white oak and is supplied with LETTER FILES and large drawer in right pedestal. Size, 36 inches long, 28 inches wide, 44 inches high.

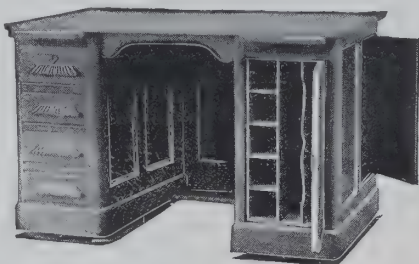


NO. P. 212, STYLE "A."

**\$43.50** buys this desk exactly as illustrated. It is 60 inches long, 33 inches wide, 52 inches high. It is an extra fine desk, made of quarter-sawed white oak and has FIVE COMPLETE LETTER FILES in the right swing pedestal.

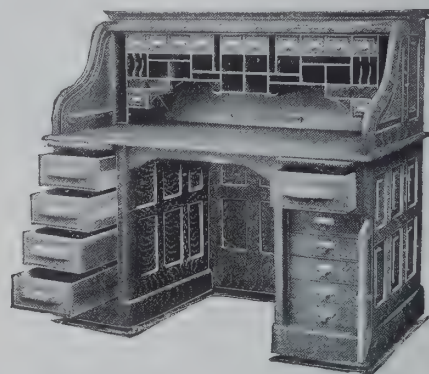
60 inches long, style "A," \$43.50.  
Style "B" or "C," \$40.00

**NOTE.**—Style "A" has drawers in left pedestal and letter files in right pedestal as illustrated. Every person must have some place for letters, invoices, receipts, etc. Style "A" provides complete LETTER FILES within arm's reach, dust proof and under lock and key—a *very desirable feature*. Style "B" has drawers in both right and left pedestals. Style "C" has drawers in left pedestal and book cupboard in right pedestal.



NO. P. 216, "C."

**\$11.60** buys this desk exactly as illustrated. It is 50 inches long, 30 inches wide, 31 inches high. It has closed back and is made of selected oak. Style "B" or "C," \$11.60.



NO. P. 241, STYLE "A."

**\$35.00** buys this desk exactly as illustrated. It is 55 inches long, 32 inches wide, 51 inches high. It is made of the best figured quarter-sawed oak or cherry, and has FIVE COMPLETE LETTER FILES in right pedestal.

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ALL DESKS are made of the best quality of white oak and are supplied in either light, medium or dark finish to suit purchaser, medium being supplied unless otherwise requested. All our desks are finished with best quality of piano polish finish.

ORDERS: We are well known to the leading export merchants of New York City, any of whom will be pleased to execute orders for our goods.

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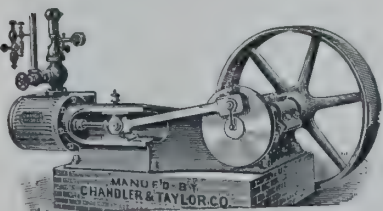
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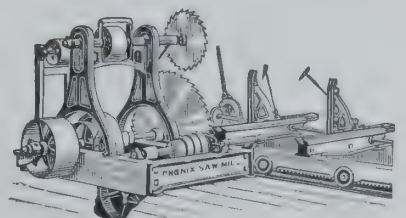
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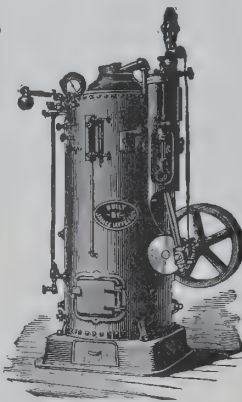
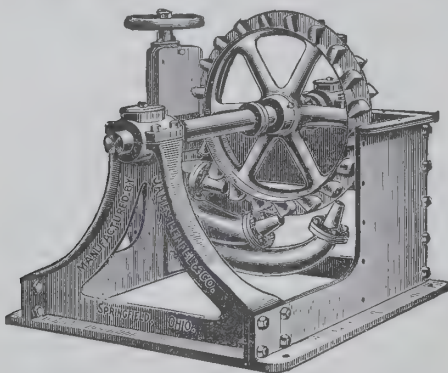
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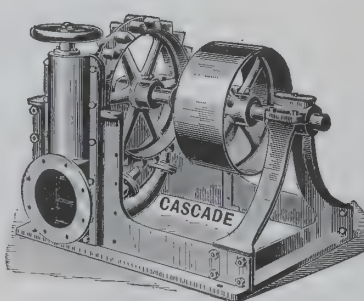
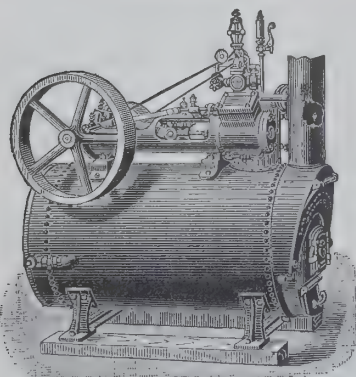
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Improved Crystallized Eggs.

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Simply fresh candled eggs removed from shell and dessicated; staple in markets of United States; used for thirty years by all leading bakers; used for every purpose that the fresh shell egg may be used for, including scrambling, omelets and custards.

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No breakage, always reliable and evaporated in the lowest egg market in the United States, therefore cheap.

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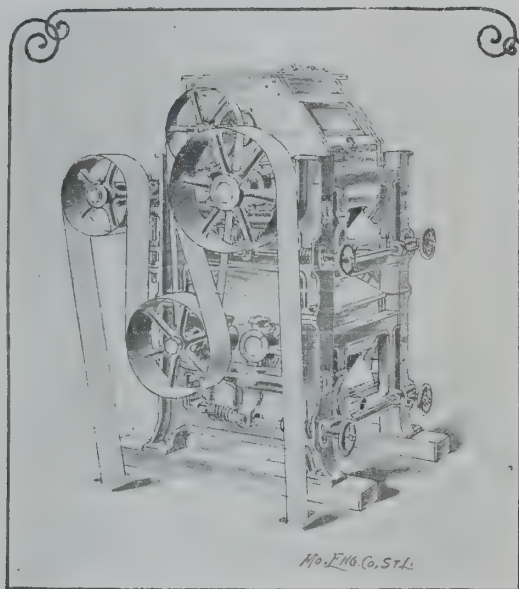
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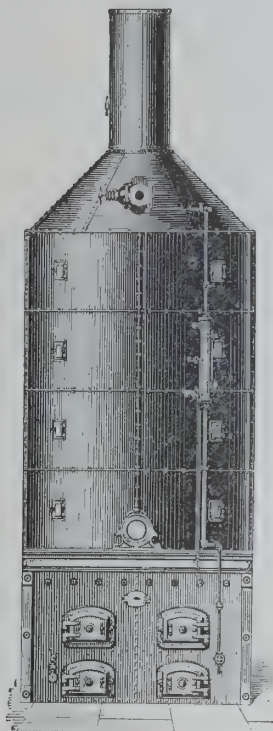
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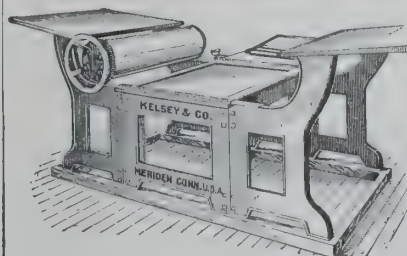
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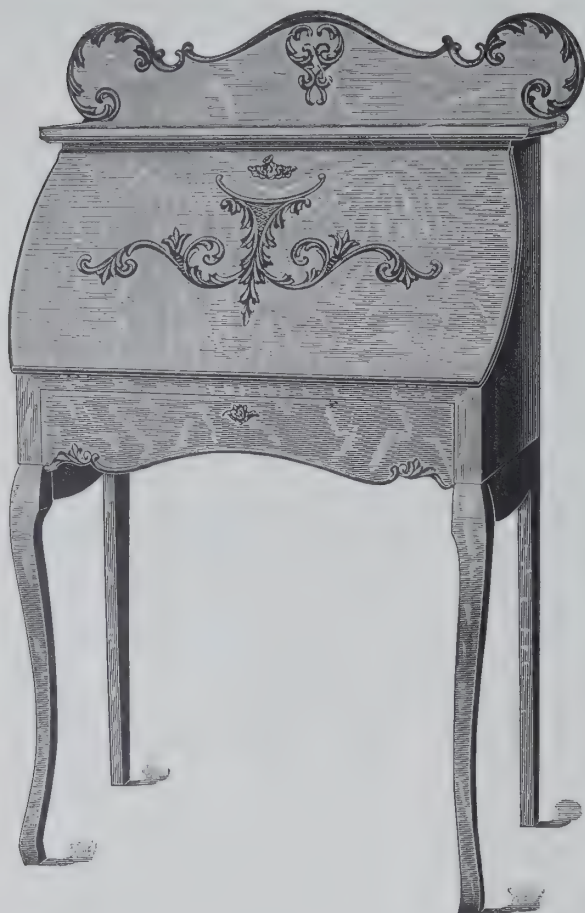
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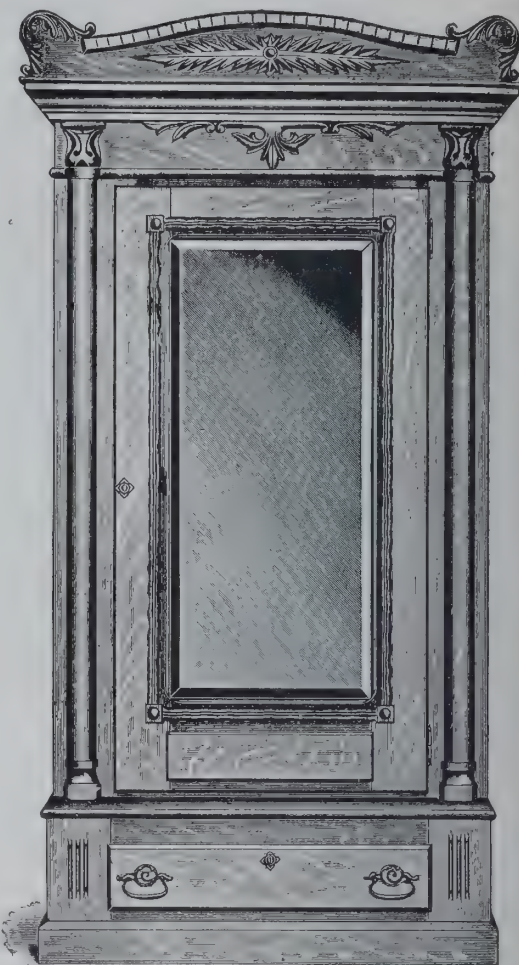




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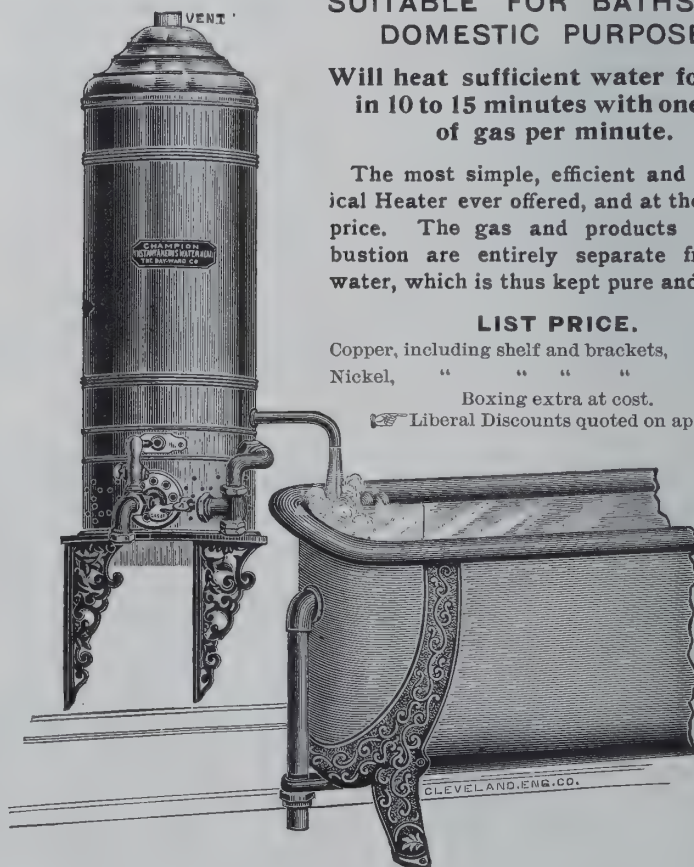
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# THE AMERICAN EXPORTER

(Founded by Root & Tinker, 1877),

AND

THE AMERICAN MAIL AND EXPORT JOURNAL

(Founded by Howard Lockwood & Co., 1877).

**THE JOHN C. COCHRAN COMPANY, Publishers.**  
Bennett Building, New York.

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## MANILA.

AT daybreak on the morning of May 1st the American Pacific squadron of six ships entered the harbor of Manila and engaged the Spanish fleet operating in those waters. Eleven of the Spanish vessels comprising the flagship and all the war ships of importance in the fleet were destroyed, while the American squadron was uninjured. The influence of this victory upon the destinies of the Philippine Islands cannot at present be estimated, but its effect upon American commerce is immediate and far-reaching. Two great oceans, the Indian and the Pacific, with all contiguous and connecting seas, have been removed, as it were, at one stroke from all the dangers and inconveniences of war. With the power of Spain in these waters annihilated American trade there will go as if no war no longer existed.

We reprint, as expressive of our own feelings and those of all Americans, the resolutions passed by the New York Chamber of Commerce at its 130th annual meeting:

*"Resolved, That the thanks and congratulations of the Chamber be offered to Commodore Dewey and the gallant officers and crews of the Asiatic squadron, who, by one blow, struck under circumstances of peculiar heroism, have relieved our Pacific Coast from fear of attack, freed our merchant ships in the East from dread of capture and while adding new lustre to brilliant annals of the American Navy, have helped importantly to shorten the war."*

## AMERICAN TRADE GOES ON.

AFTER half-a-century of peace with foreign nations, those who are interested in the trade of the United States have had practically nothing to guide them in determining in advance the probable effect upon business of war with a foreign power. The American Civil War, when nearly three million men were actively engaged, when the battle-ground was in the heart of this country, and when the resources of the nation were strained almost to the breaking point, obviously afforded no data from which to judge the consequence of a struggle that must necessarily be fought largely upon the sea and wholly at a distance from our own territories, and in which, in all probability, not one per cent. of our active male population would be engaged. Added to this was the further consideration that the conflict of '61 was an internecine war, each battle in which tended to widen the gap that separated the combatants, while now the nation will be united against all foreign foes, and any disaster or unexpected peril will serve only to knit the formerly opposing sections the more firmly together.

It was this absence of precedent, this uncertainty as to what consequences were probable and what were not, that gave to the long period of suspense when diplomacy was fighting its losing battle for peace, its chief terrors. Commerce is proverbially timid, and it was feared that business men in general would be prone to exaggerate rather than minimize the dangers of the situation when actual war broke out. This, happily, has not proved to be the case. Hard-headed common sense—a part of the stock-in-trade of so many American business men—asserted itself, and, ignoring the clamor of sensational and senseless newspapers, estimated the situation accurately and with judgment. The following from *Bradstreet's*, of April 30th, sum up the situation as it existed at the moment when all danger that there would be any slump in business was first past. Since that article was written the battle of Manila has made the situation described permanent:

Perhaps the infinite power of adaptability to circumstances of the American people was never better illustrated than it has been in the week following the declaration of war with Spain. With a hesitation so slight as to amount almost to indifference the business community, relieved from the tension caused by the incubus of doubt and uncertainty which so long controlled it, has stepped confidently forward to accept the situation confronting it owing to the changed conditions inevitable upon the breaking off of friendly relations with a foreign power. So few have been the unfavorable circumstances attending the rupture, temporary as these must be at the worst, that they have hardly excited remark, while the stimulating effects have been so numerous and important as to surprise all but the most optimistic. *Bradstreet's* state of trade report this week will bear careful reading by every business man who is anxious to measure the actual results which have flowed from the ending of the period of inaction. The list of advances in prices of staples which presents itself this week is a notable one. The agricultural classes can hardly view with unconcern the marking up of all the products of their industry, and the manufacturing interests, while slower to feel the favoring breeze, must surely in time profit largely thereby, because the development of the foreign demand this week is merely a tardy recognition of the fact that this country to-day occupies an enviable position as a producer of staples which European and other consumers must have. While undoubtedly some of the advances, particularly in imported goods, are based upon fears of interruption of supplies or of higher taxes, the former of which, owing to most of our supplies coming in foreign ships, seeming quite unlikely, the fact is that history seems likely merely to repeat itself in witnessing a stimulated demand for all necessities and luxuries growing out of the impetus given to general business by large expenditures alike on foreign and domestic account.

Regarding the condition of domestic trade in the United States, nothing need be added to this account. It is apparent that foreign buyers have absolutely nothing to fear as to the ability of American manufacturers to fill all orders as promptly and efficiently as heretofore. American manufacturers, on the other hand, have never at any time had any ground for supposing that foreign buying would be in any way affected by this war. The demand for bicycles in England that leads an English bicycle manufacturer to desire to equip his plant with American machinery, so far from falling off in consequence of a Spanish-American war, is likely to be increased by it. There will be no diminution in the European demand for American bicycles and labor-saving machinery, the South African demand for American mining machinery, and the demand for



American agricultural machinery all over the world. On the contrary, everything points to an unwonted briskness of demand for supplies of all kinds everywhere. It is for the American manufacturer himself to say whether or not he will be a competitor in all this activity, a sharer in this world-wide prosperity.

### THE RIGHTS OF NEUTRALS.

IT is a matter for profound satisfaction that both the United States and Spain have taken the most liberal possible attitude with reference to the rights of neutrals and in recognition of the inviolability of enemy's goods, not contraband of war, covered by a neutral flag as well as that of neutral goods under the enemy's flag. Both subscribe in set terms to the first three clauses of the Treaty of Paris, which are:

"1. The neutral flag covers enemy's goods, with the exception of contraband of war.

"2. Neutral goods not contraband of war are not liable to confiscation under the enemy's flag.

"3. Blockades, in order to be binding, must be effective."

The result of this is that practically the entire foreign commerce of the United States will now go on as if there was no war at all. As we pointed out in our last issue, under normal circumstances the amount of our exports carried in American bottoms is only about 7 per cent. of the whole. At present all of the largest and fastest vessels in our merchant fleet have been either purchased or leased by the Government for its auxiliary fleet and their places taken by vessels of foreign registry. Practically all other vessels belonging to us have been similarly replaced or are employed in waters, like those of the Pacific and the Philippines since the battle of Manila, that are safe. It goes without saying that any undue interference with the vessels of a neutral power by either belligerent would be so strongly resented as to be altogether out of the question.

The term contraband of war has been sufficiently defined to prevent any anxiety on the part of shippers lest their goods be taken on the pretext that they are contraband. The definition of the American Government, as affecting only commerce with Spain, is not of interest to our readers.

"Spain defines contraband of war as 'cannon, quick-firing guns, shells, rifles, all patterns of cutting and thrusting weapons and arms of precision, bullets, bombs, grenades, fulminates, capsules, fuses, powder, sulphur, dynamite and explosives of all kinds, as well as uniforms, straps, pack-saddles and equipment for artillery and cavalry, marine engines, and in general all appliances used in war.'"

This list is reasonably explicit and brief and leaves no occasion for anxiety on the part of timid shippers lest their wares be seized as contraband under some arbitrary or fantastic interpretation. Trade in articles of commerce other than these will not be interfered with.

### THE PRIVATEERING BUGABOO.

A HUNDRED years ago there was no nursery in the United States that did not know all about Captain Kidd and his rakish craft with its black flag bearing skull and crossbones at the mast, and even to this day the spectre of that renowned pirate is often invoked to scare small children to sleep or at least to bed. At present it looks very much as if Spain was trying to make a similar bugaboo out of privateering for the purpose of scaring American shippers and those who do business with them. There was a great outcry raised on both sides of the Atlantic at the beginning of the war about the destructive part that privateers were destined to play in the conflict. The fact that the United States and Spain were, curiously enough, about the only civilized powers that had not signed the Treaty of Paris abolishing privateering seemed to give some color to the views of the alarmists. The United States Government has now declared explicitly that it will not engage in privateering by issuing letters of marque. The Spanish Government declares that it does not do so at present, but intimates that it may. That this intimation is intended as a threat is evident. How much need sensible business men be frightened by it?

Very little indeed. Privateering nowadays is neither simple

nor easy. We are no longer in the good old days when a brig or a schooner could be transformed into a privateer by shipping a few barrels of powder and some carronades. A modern privateer must be a steamship, and a fast one at that, since all prizes worth capturing at all are steamers. It must be strongly armed, since any merchant vessel can carry a couple of modern rapid-fire guns capable of doing frightful execution unless silenced from a distance. But in the present war not only is coal a contraband of war, thus depriving privateers of all possibility of making distant cruises, but most neutral ports will be closed to such vessels. More than this the great powers have intimated in terms so strong as to be unmistakable that they will tolerate no interference with their own shipping by privateers on any pretext. Spain will not disregard this warning. And lastly, it is too late for these adventurers to hope for American prizes in any but American waters. Out of a total of 20,978 vessels of all kinds flying the American flag in 1897, 19,802 were engaged in coastwise, lake and river trade. The fraction of the twentieth part engaged in foreign trade that were in European waters at the outbreak of the war are now in places of safety where they will remain. Rear-Admiral Dewey at Manila insured the safety of all who are in the far East and the Pacific. The risks that would have to be run in attempting to reach the coasts of this country through the swarm of swift cruisers that now protect it are too great to make privateering over here worth much as a commercial venture. The simple fact that a vessel would exhaust its coal supply in getting here, and that none could be obtained without running the blockade at Havana or Porto Rico, is prohibitive.

The truth of the whole matter is that privateering is a relic of another time. Electricity and the transoceanic cable, steam, with the resulting importance of coal, and the expansion of commerce into an international institution, all combine to render privateering an impossibility whatever its legal status may be. As a bugaboo to scare timid merchants the threat of the Spanish Government is all very well, but as a matter of deliberate naval policy we doubt if a fulfillment of the threat is even contemplated.

### THE CHEAPEST MACHINERY—ADAPTABILITY.

ONE of the most important points for a machinery buyer to consider before definitely deciding in which market he will make his purchases is adaptability. After learning the price and the labor-saving capacity of the various machines presented to his attention he should seek to ascertain which of them is best adapted to work under the conditions that exist in his own business. The answer to this question is largely to be found by inquiring into the conditions that gave rise to the machine and under which it worked in the country of its invention. If, for example, our machinery-buying friend is interested in agricultural machinery and is purchasing for the Russian market he will be most impressed by those agricultural implements and machines that have been developed and tested amid surroundings and conditions most nearly similar to those that exist in the territories of the Czar.

It is doubtless for this reason that in point of fact Russian agriculturists are buying in vastly increased quantities the agricultural machines and implements of the United States and in steadily diminishing quantities those manufactured in countries enjoying the advantage of a greater proximity to Russia. American farm machinery was invented in the first place with reference to its use on a great variety of soils and surfaces. In the vast domain that extends from the Atlantic to the Pacific are found almost every type of landscape upon which the human eye ever rests. Among them all the most prominent in area and productivity are the great level prairies of the West, and every manufacturer of agricultural machinery in America has had such plains in view in designing at least one type of each machine. The Steppes of Russia present much the same problems that have been solved by American inventors with reference to conditions existing in their own country. After the searching tests and fierce competition to which every American make has been subjected in its own country there can be no fear as to their adaptability to any land where large tracts of



level or rolling country enable agriculture to be carried on most profitably on a large scale.

But while farm machinery, adapted peculiarly for work on large level surfaces such as exist in most new countries to-day, has reached a high degree of perfection in this country, the fact that there are in the United States whole groups of States in the extreme East where opposite conditions to the foregoing are true has prevented our manufacturers from devoting themselves exclusively to the production of machinery adapted to level and rockless countries. In New England and New York, regions with teeming populations and great wealth, the country is exceedingly hilly and rocky in many localities. Special types of machines have been manufactured to meet these conditions and in consequence the American manufacturer can justly feel that his products are adapted to any surface and any soil. Not that any single machine possesses such an extraordinary flexibility as to be able to work to equal advantage under opposite conditions, but that, owing to the variety of the domestic demand, a special type of machinery has been perfected for almost every possible combination of requirements.

A very similar state of affairs confronts the manufacturer of mining machinery in America. It is said that the single State of Colorado possesses a greater variety of ores than any other district of the same size in the world, and throughout the entire extent of the United States there is a diversity and a richness of mineral wealth that has produced mining operations of almost every conceivable description. For this reason mining-machinery makers in this country have for many years past been grappling with and solving all imaginable ore-treatment problems. The comparatively close proximity of the mines and mining-machinery works has kept the able men engaged in mining and ore-treatment operations in close contact with the men engaged in designing and erecting the plants, with the result that every improvement that a combination of scientific knowledge and practical experience could devise has been adopted as soon as suggested, each year seeing something discarded as inferior and distinct advance made until to-day, whether the mining plant is to be erected in South Africa, Mexico, West Australia or the Klondike, there is little probability that it will present problems that American mining machinery-makers have not already faced and solved.

Illustrations of the importance of securing the machinery best adapted to the exact conditions and requirements of each individual case might be multiplied indefinitely, but enough has been said to suggest the line along which such inquiries should be made. It remains only to point out that, owing again to the diversity of conditions existing in so large a country, American makers of almost every description of machinery are accustomed and prepared to modify their models so as to meet the requirements of individual cases, or, if necessary, to design and construct special machinery to order, thus securing for the purchaser the highest degree of adaptability in his machinery to the conditions of his own peculiar requirements.

### INDUSTRIAL SUPREMACY IN THE AGE OF STEEL.

THE closing years of the nineteenth century are witnessing a contest much more important and far reaching in its effects than the one between the United States and Spain that is at this moment absorbing public attention. This great contest is, however, a friendly one in which the success of one nation must ultimately redound to the benefit of all. The struggle—rivalry would perhaps be a better word—to which we have reference is that between industrial nations for the supremacy in the iron markets of the world.

From the moment that the importance of iron as a factor in industry came to be recognized until very recently Great Britain has easily dominated the situation. In 1880, however, the output of Bessemer steel ingots in Great Britain was surpassed by the United States, the first break in a hitherto uninterrupted period of supremacy. For the next few years Great Britain maintained a slight advantage in the race, but in 1889 her output, which amounted to 2,140,791 gross tons, was greatly surpassed by that of the United

States, which was 2,930,204 gross tons. This margin has since steadily widened, as the accompanying table shows.

	United States.	Great Britain.
1890.....	3,688,871	2,014,843
1891.....	3,247,417	1,642,005
1892.....	4,168,435	1,500,810
1893.....	3,215,686	1,493,454
1894.....	3,571,313	1,535,384
1895.....	4,909,128	1,530,225
1896.....	3,919,906	1,816,842
1897.....	5,475,315	2,141,791

In steel rails the figures for the same period indicate an equally striking excess of the American over the English output.

	United States.	Great Britain.
1890.....	1,867,837	1,019,606
1891.....	1,293,053	662,676
1892.....	1,537,588	535,836
1893.....	1,219,400	579,386
1894.....	1,016,013	598,530
1895.....	1,299,628	604,353
1896.....	1,116,958	817,476
1897.....	1,614,399	943,083

Similar figures might be given showing the relative production of pig iron, wrought iron, etc., but these will suffice for our present purpose.

Till within two or three years, however, there was nothing in all this that seriously affected international trade, except as regarded the domestic market of the United States. The American iron masters were gradually conquering their own vast and rapidly expanding home markets, but till 1895 they were able to do little more. In that year the position of the United States as a producer and exporter of pig iron, wrought iron and steel is clearly shown in the following table prepared by Mr. J. Stephen Jeans, secretary of the British Iron Trade Association:

Country.	Output Tons.	Exports Tons.	Percentage of Output Exported.
Great Britain.....	11,824,000	2,883,000	24.39
Germany.....	9,593,000	1,523,000	15.87
Belgium.....	1,643,000	489,000	29.74
France.....	3,466,000	209,000	6.02
United States.....	15,886,000	91,000	.57

In 1895 the importance of the exports of iron and steel from the United States was evidently almost nil, both to those engaged in that already vast industry and to the world at large. The following table will give some conception of the magnitude of the change that has taken place in the two years that followed. It shows only those items of greatest bulk, excluding machinery and finished manufactures of iron and steel other than rails and wire, since the weight of these are not always given in the official reports. While thus far from complete it none the less presents an adequate basis for comparison with the results just tabulated:

Article.	1895		1896		1897	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Pig iron.... tons..	22,517	\$277,066	29,863	\$471,890	168,803	\$2,331,771
Scrap iron, etc. "	.....	.....	1,172	11,389	16,566	193,503
Steel ingots. " "	3,488	95,471	2,904	125,151	46,258	1,121,090
Steel rails.... "	10,089	266,793	22,263	540,797	107,991	2,482,208
Wire..... "	30,046	1,277,479	35,469	1,506,885	53,864	2,242,617

The significance of this showing, incomplete as it necessarily is, cannot be missed. It means that at last American production of iron and steel has caught up with consumption, and that American industrial methods in the iron and steel trade have been perfected until we can compete successfully with any one. If any further proof of the first conclusion be necessary it is furnished by the fact that coincident with the sudden expansion of our exports of steel rails indicated in the preceding table our imports fell off from 7,796 tons in 1896 to 415 in 1897, or practically to the vanishing point. As to the other conclusion, that this remarkable increase in exports of iron and steel means that competition is now possible, the following table showing the estimated average cost of producing a ton of Bessemer pig iron in the five principal iron manufacturing countries, assuming current market rates and freights, is convincing evidence. We take the table from an article in *The Iron and Coal Trades Review*, London, which we reprint in full on another page of this issue.

	Great Britain. Cleveland.	Germany. Westphalia.	Belgium. Liege.	France. Loire.	United States, Pittsburg.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Iron ores.....	1 10 0	1 12 0	1 12 0	1 18 0	1 7 6
Coke.....	13 3	14 0	14 6	13 6	6 0
Limestone.....	2 0	2 6	1 6	1 6	1 6
Labor.....	2 9	3 0	3 6	3 3	2 6
Sundries.....	1 6	1 9	1 6	1 6	1 0

Total..... 2 9 9    2 12 3    2 13 0    2 17 9    1 17 6

The importance of these facts is simply vast, almost incom-



mensurable. They mean that the raw material cost of all iron and steel manufactures in the United States have fallen and are still falling with a rapidity that is startling. As an illustration of the long road over which American iron masters have had to come in order to reach the results shown we may point out that American-made steel rails sold in 1867 for \$160 a ton, in 1873 for \$90, in 1884 for \$62, in 1890 for \$30, while the present price has recently been fixed at \$18 for standard 30-foot rails and \$20 for 60-foot rails. In a future number we may endeavor to show how these marvellous results have been accomplished. For the present it must suffice to have shown that they have been accomplished. The United States is to-day not only far the largest producer of iron and steel in the world, her annual output almost equalling that of all other nations combined, but she produces at the lowest cost.

From the standpoint of the buyer of all articles of commerce into whose composition iron or steel largely enter this means that a new market has come into being for his benefit. If he lives in a country that has no iron industries of its own he now enjoys the advantage of a lower market than he has heretofore known, enabling him to save money on purchases of a thousand kinds. If he lives in a country possessing iron industries he none the less enjoys the advantages that spring from a keener competition, checking extortion and stimulating excellence of product.

#### AMERICAN TRADE WITH SPAIN'S FORMER COLONIES.

OF vastly more importance to the United States, and potentially at least to the world, is the commerce of Cuba, Porto Rico, the Phillippine and the Canary Islands. The revolution throughout the Spanish colonies during the past three years had already all but annihilated American trade with these regions, as the following brief statement shows:

##### IMPORTS.

	1894.	1897.
Cuba.....	\$75,678,261	\$18,406,815
Puerto Rico.....	3,135,634	2,181,024
Phillippines.....	7,008,342	4,383,740
Canaries.....	23,123	49,909
Spanish Africa.....		
Total.....	\$85,845,360	\$25,021,488

##### EXPORTS.

	1894.	1897.
Cuba.....	\$20,125,321	\$8,269,776
Puerto Rico.....	2,720,508	1,988,888
Phillippines.....	145,466	94,597
Canaries.....	203,257	297,878
Spanish Africa.....		4,740
Total.....	\$23,194,552	\$10,645,881

Bad as this showing is it is still worse when we reflect that much of the exports of the past two or three years have been food and supplies for the Spanish armies, and that, therefore, even the above tables do not begin to indicate the extent to which normal commercial relations have been destroyed. A surer index to the real state of affairs is found in the tables showing the exports of machinery and manufactures of iron and steel. The condition of our export trade to Cuba in these articles is fairly typical of that with the others.

	1892.	1893.	1897.
Locomotive engines.....	\$392,415	\$418,776	\$20,638
Sewing machines.....	246,218	95,630	3,199
Stationary engines, boilers, etc.....	415,020	452,936	36,767
Saws and tools.....	130,393	243,544	34,686
Builders' hardware.....	294,490	395,964	49,486
Steel rails.....	28,460	326,654	14,650
Wire.....	115,583	321,120	35,905
Machinery not otherwise classified.....	1,952,740	2,792,050	55,096
Miscellaneous manufactures of iron and steel not otherwise classified.....	600,203	1,255,139	94,958

When peace is finally restored and these unhappy lands have been given the blessing of a free and enlightened government and all their latent possibilities are stimulated into life by a wise and efficient administration the commerce of every nation in the world that engages in foreign trade will be benefited and American trade will be well compensated for its losses during the three years of conflict that have passed.

#### AMERICAN TRADE WITH SPAIN.

IN consequence of the hostilities between the United States and Spain all direct trade between the two countries must for the time being cease. Americans engaged in foreign trade need not regard this fact, however, with much concern. At present our trade with Spain constitutes scarcely an eightieth part of the whole commerce between the United States and Europe, and has, moreover, been steadily declining for a long time, in sharp contrast with our trade with every other country in Europe, which has been increasing by leaps and bounds.

It attained its maximum development in 1883, when the combined imports and exports reached a value of \$24,725,632, or more than \$10,000,000 in excess of the present figures. The returns for 1897, with the single exception of those for 1895, which fell to \$14,501,195, were the lowest recorded since 1878, twenty years ago. The average value per annum for the last five years, 1893-97, amounted to \$16,240,588, as against \$18,305,404 for the five years immediately preceding.

The balance of trade has been very decidedly in favor of the United States. During 1897 our exports to Spain were valued at \$10,912,745 and our imports from that country at only \$3,631,973, leaving a trade balance in our favor of \$7,280,772, and practically the same relation of imports to exports is maintained each year.

The following tables show the principal items of the imports from and exports to Spain for the fiscal year ending June 30, 1897:

##### IMPORTS

Crude tartar.....	\$90,516
Glycerin.....	47,013
Licorice root.....	60,515
Natural mineral waters.....	18,510
Chemicals, drugs and dyes.....	70,361
Cork.....	347,576
Cotton waste.....	25,284
Oranges.....	79,651
Raisins.....	261,957
Other fruits.....	579,041
Almonds.....	477,248
Goat skins.....	65,386
Iron ore.....	175,826
Sulphur ore.....	352,763
Manufactures of palm leaf.....	110,917
Manufactures of wood.....	30,793
Still wines.....	514,388

##### EXPORTS.

Corn.....	\$200,907
Medicines.....	11,121
Wheat.....	23,230
Cotton.....	8,276,566
Machinery.....	10,091
Finished leather.....	14,592
Resin.....	21,605
Mineral oil.....	540,736
Lubricating oils.....	22,485
Paraffin and paraffin wax.....	12,900
Leaf tobacco.....	738,730
Lumber.....	36,787
Boards, deals and planks.....	115,945
Staves and heading.....	743,831

It is probable that the war will not seriously interrupt the export trade in the principal items of the foregoing table, further than to necessitate a more indirect route of shipment, via either France or Portugal. Cotton, for example, Spain must have, and even should she purchase Egyptian and Indian cottons for the present that would only make a shortage in some other market that it would require a corresponding increase of American exports of cotton to fill. Similarly corn, mineral oil, tobacco, and timber, staves, etc., must all come from outside the peninsular, and a temporary shifting about of Spanish orders would have little effect on the total exports of the United States.

As far as it will affect the commerce of the world, or even of the United States, the war between this country and Spain will scarcely be noticed. The total number of the vessels engaged in Spanish commerce which entered American ports last year was 173, with an aggregate tonnage of 143,572 tons. The number that cleared was 137, displacing 159,655 tons. The combined total is a great deal less than one per cent. of the foreign commerce of the United States alone, which was 47,469,445 tons.



## FOREIGN ORDERS SHOULD BE EXPLICIT.

IT may seem trite enough to state that parties ordering goods at a distance should ask for exactly what they want, but everyday experience proves that there are numberless buyers who, however well they may know their own requirements, fail when it comes to making out their order to state their wishes so explicitly as to insure getting exactly what they desire and nothing else. In the case of foreign orders, the necessity for care is especially urgent, and too much attention cannot be paid to this preliminary.

In the case of machinery being explicit is not altogether so easy as it may at first seem. The buyer, if he is purchasing machinery of an unfamiliar type, must be sure that he understands himself just what he or his clients require. Only a few days ago a well-known American manufacturer said: "We recently had an experience with a Swiss firm. It ordered a special grade of machinery, specifying that it was to do certain work. We informed them that the article they sought would not do it, that they needed another machine, which we recommended, but they insisted on having the article they ordered. They got it, and a few weeks later cabled us for prices on the article we had originally named them."

Most catalogues give full directions as to how to order goods, and an advertisement often furnishes all the information necessary. But ordinarily, of course, there are men connected with every plant entirely competent to so frame orders as to avoid all possibility of mistakes. Such persons should invariably be consulted, since there must necessarily be much that calls for expert judgment. In ordering a water-wheel, for example, the buyer must state the amount of water available either in miner's inches or in flow per minute in gallons or cubic feet, the head or vertical fall from source of supply to point of application, length and diameter of carrying pipe, horse-power required and what it is designed to run. All these details are matters for careful determination; guesswork will not do at all. Similar care and explicitness are necessary in the case of many other machines.

The little things in a foreign order should not be neglected. Addresses and routes to be followed in shipping, manner of packing, if exceptional, references if remittance is not sent with order, should all be attended to. Mention of paper in which advertisement was seen or how correspondent learned of article ordered frequently simplifies matters a great deal, besides being a favor to the manufacturer. Large concerns frequently advertise a special type each month, and a reference to advertisement, giving date, will do as well as much description. Buyers should insist in their orders and throughout upon getting exactly what they specify. Substitution is one of the frauds of the day, and no pretext of "just as good as" or "a little cheaper" should be tolerated. We may add that the trade catalogues of American manufacturers are celebrated the world over for the thoughtfulness and thoroughness of their instructions as to ordering, the fullness of their tables and other data for the assistance of buyers, and the accuracy and beauty of their illustrations.

OUR attention has been called to the alleged fact that a dealer in American bicycles found himself obliged to give up handling machines made in his country owing to the difficulty of securing parts or of making repairs. We do not know what make of American wheels this dealer carried, but we have no hesitation in stating that if any such difficulty as that reported by this dealer existed, it was because he had neglected to inform himself as to the location of the central agencies established in Europe by the house of which he bought his wheels, or because he had bought some cheap line of a jobber or of some small house in this country not catering regularly to the export trade. Any dealer buying of established houses that understand the conditions of export trade and are prepared to fulfill them—such houses, for example, as those whose names are printed in the advertising pages of our bicycle department—will experience no such difficulty as that which is said to have caused this dealer so much trouble. He can inform himself at the cost of a postal-card as to the location of the nearest central agency of his house, where

all supplies are constantly kept in stock, and repairs, if needed, can be promptly attended to. Such agencies now exist in nearly all the great European capitals. It is not our purpose to claim any impossible degree of immunity for American wheels from the ordinary hazards of riding, but it is a fact that riders of standard American wheels will rarely have occasion to resort to the repair shop if they treat their wheels with reasonable care. Should an accident occur, no intelligent dealer need keep his customer waiting a day longer for repairs to an American wheel than would be necessary had it been made in his own country.

THE preliminary returns have already been published by the Bureau of Statistics at Washington regarding the export trade of the United States for the month of April. As the air was filled with rumors of war and premature announcements of its declaration the entire month may, as far as commercial statistics are concerned, be regarded as a war month. The showing is, however, anything but unsatisfactory:

IMPORTS AND EXPORTS OF THE UNITED STATES FOR THE MONTH AND TEN MONTHS ENDING APRIL, 1897 AND 1898.

MERCHANDISE:	April		-10 Mos. Ending April-		Increase (+), Decrease (-).
	1897.	1898.	1897.	1898.	
Exports—Domestic.....	\$76,098,128	\$98,125,893	\$883,824,445	\$1,008,744,647	+\$124,920,202
Foreign .....	1,550,658	1,301,067	16,104,801	16,682,034	+577,233
Total .....	77,648,786	99,426,960	899,929,246	1,025,426,681	+125,497,435
Imports—Free of duty..	\$50,889,374	\$24,410,783	\$304,076,276	\$243,113,197	-\$60,963,079
Dutiable .....	50,433,032	31,512,875	296,112,968	268,067,989	-28,044,979
Total .....	101,322,406	55,923,658	600,189,244	511,181,186	-89,008,058
Excess of exports.....		43,502,802	299,740,002	514,245,495	+214,505,493
Excess of imports...	23,673,620				

This record is the most remarkable in the history of the United States. While much of the increase is beyond question due to the enormous shipments of wheat and agricultural products and the exceptional prices obtained therefor, it is important to note that our exports of manufactures are more than holding their own. At present it is not possible to give in detail the figures upon machinery and manufactured products. These we shall be able to give next month when the returns to the Bureau of Statistics are complete. But from the returns already in it is evident that shippers are not worrying much on account of the war, but that American export trade is going on with giant strides.

ONE of the pleasant aspects of the existing war is the manner in which it has brought clearly to the surface the latent spirit of sympathy between the British Empire and our own country. While the American people are in no need of assistance, it is more than gratifying, it is inspiring, to feel that we have behind us the approval and the moral support of the people that knows us the best. Whatever the future may have in store for the great English-speaking Republic and the great English-speaking Empire, it is enough for the present to know that the bonds of kinship and of fifteen hundred years of common history are not idle dreams and fancies, but that there are in very truth ties that times of common danger will only strengthen, binding together the whole Anglo-Saxon race.

## Wheat Crop of the World in 1897.

THE monthly statement of finance and commerce issued by the Bureau of Statistics shows that the wheat crop of the world last year was 2,139,549,168 bushels, which is smaller than that of any year since 1890. In the United States the crop was larger than any year since 1891. A table of farm prices of wheat in the United States during a term of years gives the average farm price of wheat in 1897 as the highest, with three exceptions, since 1863, the exceptional years being 1888, 1890 and 1891.

A table of freight rates on wheat shows that the average rate by rail from Chicago to New York has fallen from 16.5 cents per bushel in 1886 to 12.32 in 1897, and that the rates by lake and canal fell in the same period and between the same points from 8.71 cents per bushel to 4.35 cents per bushel.

The wheat in farmer's hands in the United States on March 1, 1898, was estimated at 121,320,500 bushels, against 88,148,072 bushels at the corresponding date last year.



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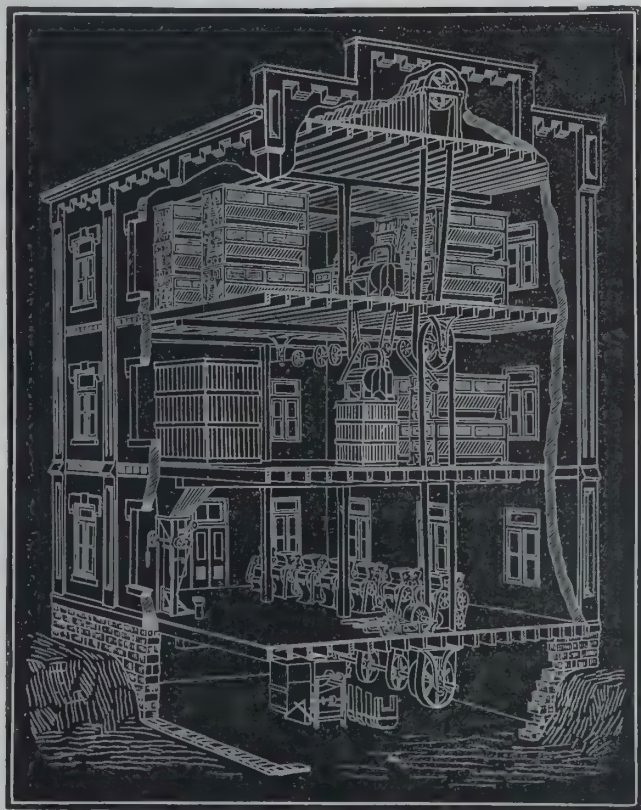
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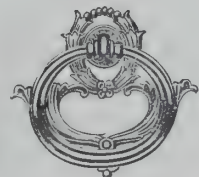
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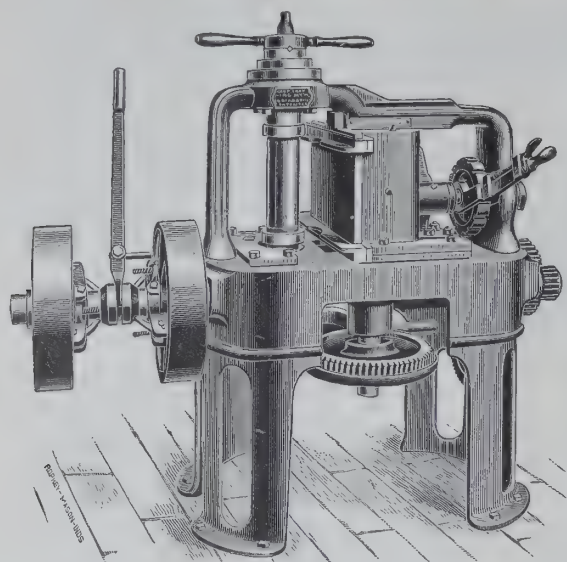


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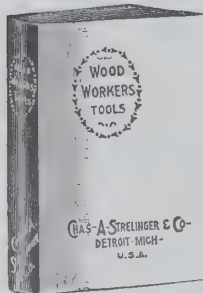
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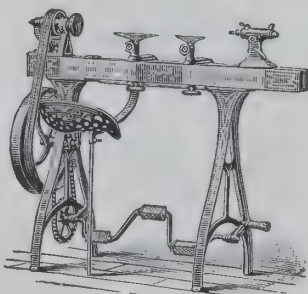
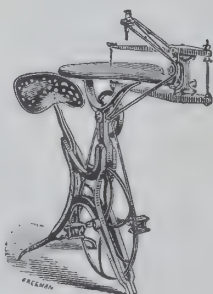
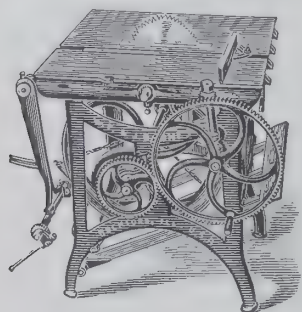
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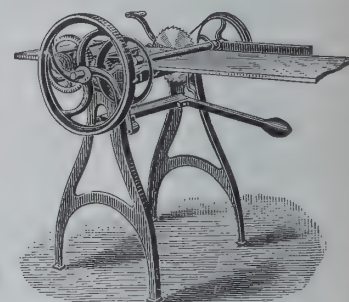
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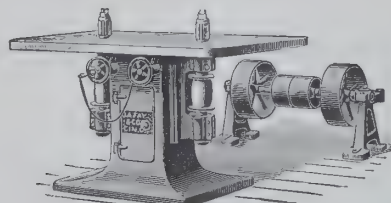
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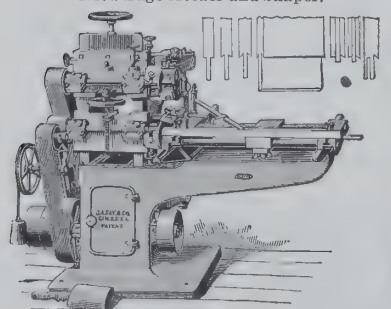
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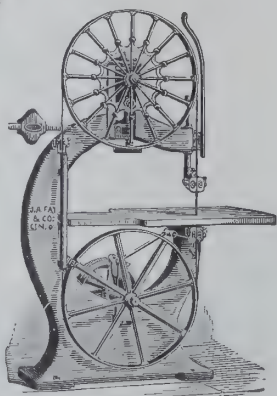
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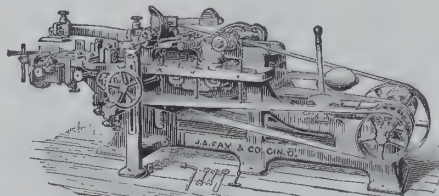
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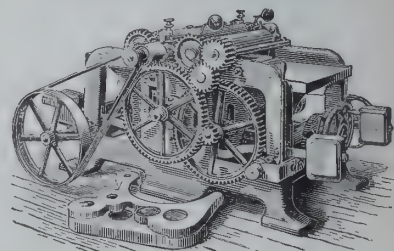
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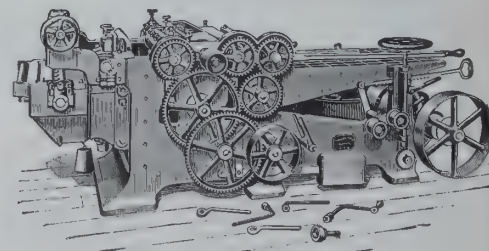
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## AMERICAN SHIPPING AND TRANSPORTATION ROUTES DURING THE WAR.

A SUBJECT of much discussion, and no doubt of considerable anxiety as well, before the actual breaking out of hostilities was the probable effect of war upon the various transportation lines that handle the sea-going commerce of the United States. The more timid of those engaged in our foreign trade apparently believed, or at least acted as though they believed, that the entire fabric of oceanic transportation was about to be demoralized, and that nobody could be sure that his goods would be safe or even that they would arrive at their destination at all.

As was pointed out in our columns last month, there has never been the slightest ground for these exaggerated fears. However, to place the matter in a concrete form, so that even the most timid could see exactly what the true situation is, THE AMERICAN EXPORTER recently took steps to ascertain the views of many of the leading transportation companies all over the country, and the statements that follow are, therefore, practically official and are entirely authoritative.

As was to be expected, all direct sailings between United States ports and points in Cuba and Porto Rico have been entirely suspended owing to the blockade. The same is true of lines between European points and those countries. As is shown elsewhere in this issue the volume of trade affected by this discontinuance is relatively small and has been steadily decreasing for some time. With the restoration of peace, however, these lines will without question be resumed, and it is entirely probable that the trade between the United States and the Antilles may expand so rapidly as to require a considerable increase in the fleets which carried that commerce before the war.

For points in Mexico the Morgan Line announces that its boats will run as usual until further notice, and that, furthermore, all goods shipped by them will be covered by a special war insurance risk assumed by the Southern Pacific Co. at, it is reported, the very low cost of fifteen one-hundredths of one per cent. In any event, of course, there are all rail routes for Mexico, and these will be so connected with the steamship lines as to admit of transportation without change of cars, goods being received at the usual points. The purely coasting lines plying between points in the United States are of course of no interest to our foreign readers, but it is worth mentioning in passing that trade over these lines, which showed a marked decline before war was actually declared, has been rapidly picking up since the outbreak of hostilities, and that several lines are assuming all war risks either entirely at their own expense or at a nominal cost, as in one case a charge of one-tenth of one per cent. exacted solely for the sake of securing data regarding valuation, etc.

These coasting lines are wholly American registry. The foreign trade of the United States, as already pointed out in THE AMERICAN EXPORTER for April, has normally been carried largely in vessels belonging to other nations. Since the declaration of war practically all American vessels engaged in foreign trade have gone out of commission, excepting those plying in waters that are already safe, as, for example, the Pacific and Indian Oceans and the waters of the far East. A large part of the American merchant marine, consisting of steam vessels and ocean liners, was withdrawn from commercial service and turned over to the Government before war was declared. The American Line turned over four of its fine ocean liners in this way, and all are now employed as ocean scouts, two, the St. Louis and St. Paul, under their former names, and the Paris and New York having been rechristened the "Yale" and the "Harvard" respectively, one of the regular warships of the Government having been named the New York. The service of both the American and the Red Star line is now carried on by vessels carrying the British and Belgian flags, under a schedule of sailings that has been slightly modified on account of the loss of the four liners above mentioned. The New York and Cuba Mail Steamship Company also put British vessels upon its service, and its sailings have been interrupted more on account of the blockade than the existence of the war generally. The Red D Line to Venezuela has also placed some of its boats at the disposal of the Government, and its sailings are now made by boats of foreign registry to replace those in Government service. It is unnecessary to

go into similar details regarding all the other lines controlled by American firms. Most of these have always employed a greater or less number of vessels of foreign registry, and there has been very little difficulty in arranging that all sailings should be under neutral flags. Almost without exception dates of sailings have been unchanged.

As to the foreign steamship companies, there never has been any reason at any time to suppose that their service would be impaired in the slightest by this little war. The Cunard Steamship Company, the Anchor Line, the Atlas Line, the Allan Line, and scores of others are and have always been protected by the British flag, and it is extremely doubtful if even so much interference as is involved in the exercise of the lawful right of search will be attempted by Spain with these lines. The Hamburg American Line, the North German Lloyd, the Royal Dutch West India Mail steamers, and, in fact, all the great transoceanic lines, report that they contemplate no change whatever in their service and anticipate no interruption.

That there will be any interruption of American commerce owing to delays or danger to shipping occasioned by the war is therefore completely out of the question. Both buyers and sellers may rest assured that as far as transportation is concerned there will be no more danger and delay than if this war did not exist at all. One of the most impressive lessons of the past few weeks has been the manner in which they have demonstrated the ability of vast commercial interests to adjust themselves to new conditions promptly and efficiently.

## A Few Facts About War-Risk Insurance.

IT has been such a long time since there has been a war involving a nation having a large foreign trade that the matter of war-risk insurance is one regarding which a great many business men are asking for information. The need of some accurate statement is the greater on account of the tremendous quantity of misinformation spread broadcast by the space-writers of the daily press.

The facts regarding the existing situation are simple enough and are not calculated to alarm anybody but the most timid. As is well known all merchandise consigned from parties in one country to parties in another ceases to be the property of the consignor and becomes the property of the consignee the moment it is delivered on shipboard. It is the latter who must see to it that the goods are protected by marine insurance under ordinary circumstances and who must collect the insurance in the event of shipwreck or other loss at sea.

This fact naturally governs war-risk insurance also, although in some instances commission houses may voluntarily obtain war insurance without specific instructions from the foreign buyer. When this is done it is of course usually at the expense of the shipper. But ordinarily war rates are asked for only at the request of the consignee.

The next point is regarding the war-risk rates in the present war. On referring to the quotations for the present week we find that neutral steam rates run from one-eighth of one per cent. to a quarter for points in Europe, Africa and the like, and that the extreme rate demanded for such risks ranged from three-eighths to half of one per cent. Obviously there is not much that is prohibitory about these rates. They could be paid on all shipments and commerce would hardly suffer any serious inconvenience.

But do they need to be paid on all shipments? This is a question that each shipper must decide for himself. The more conservative will doubtless prefer to accept the comparatively trifling tax rather than run the faintest possible risk. But, really, in the case of neutral vessels it is difficult to perceive what risk a shipment will run under the most hostile circumstances. If the goods are not contraband the utmost that can happen to them will be an examination by officers from a warship, entailing perhaps a delay of two or three hours. They can under no conceivable circumstances be seized or burned or sunk. Such a violation of international right would involve instant war with the nation under whose flag the goods sailed, and a probable compensation for the owners out of the indemnity demanded for the outrage. More than this, it now appears probable that, except in cases of blockade, the right of search will be little exercised in this war. This will remove even the element of delay.

Under these circumstances it is not surprising to find that, as a matter of fact, now that the first moment of doubt and uncertainty has given way to a full knowledge of the situation with a resulting renewal of confidence, war risk insurance is not asked for at all by many large buyers, while for the benefit of those who, through incompleteness of information as to the real facts, are still anxious, it is frequently assumed voluntarily by the manufacturers themselves or their agents and is thus eliminated altogether as a factor in the situation.



## EUROPEAN AND AMERICAN COSTS OF PRODUCING PIG IRON.

(From *The Iron and Coal Trades Review*, London.)

VERY few people appear to be aware of the great changes that have recently occurred in the costs involved in the manufacture of pig iron in different countries. It has hitherto been assumed, and to a large extent with reasonable accuracy, that Great Britain had facilities for the manufacture of cheap iron that existed nowhere else. Up to a year or two ago that was probably true. So far as Europe is concerned, it still remains the case—at any rate, among countries that manufacture pig iron on a large scale. But the conditions that make for the manufacture of pig iron are changing from year to year, and almost from month to month, and it is to be feared that many of these changes do not tend to improve the relative advantages and supremacy of our own country. Our three chief competitors in Europe are Germany, France and Belgium. We still produce pig iron more cheaply than any of them. But we do not produce iron so cheaply as is done, or should be done under ordinarily favorable conditions, in the north of Spain, and we are a long way behind the facts and possibilities of the United States. The north of Spain has the great advantage of cheap ores almost on the spot; but it has to import most of its fuel from Great Britain. Recently, the development of a coal field in the Asturias has provided the Bilbao region with another source of coal supply, so that it appears to be probable that the cost of fuel will be lowered by and by. As it is, the statistics presented in the following tabular statement show that at Bilbao the cost of a ton of coke is about 21s., against 18s. 3d. at works in Cleveland and 14s. at works in Germany (Westphalia), while the Spanish cost of ore, assuming that the works possess their own mines in the locality—as some of them certainly do—is only about 12s. per ton of pig, against a present cost of 30s. for the same class of ore bought at current prices in Great Britain, and 32s. in Germany and Belgium. The cost of fuel in the United States is cheaper than in any European country, and in some cases at least, within our knowledge, does not exceed 6s. per ton of pig. On the other hand, Pittsburg makers do not enjoy much advantage over our own so far as the cost of iron ores is concerned, owing to the greater distances over which the ores have to be transported. Speaking generally, the cost of producing a ton of Bessemer or hematite iron to-day will only amount to about 37s. 6d. in Pittsburg, against 49s. 6d. in Great Britain (in the Cleveland district—on the west coast the cost will be several shillings more), 52s. 3d. in Westphalia, 53s. in Belgium, and 57s. 9d. in France. In making these estimates we have taken the cost of labor at the furnaces at average rates in reasonably good practice. The details are appended:

STATEMENT SHOWING THE ESTIMATED AVERAGE COST OF PRODUCING A TON OF BESSEMER PIG IRON IN DIFFERENT COUNTRIES, ASSUMING CURRENT MARKET RATES AND FREIGHTS.

	Great Britain. Cleveland.	Germany. Westphalia.	Belgium. Liege.
	£ s. d.	£ s. d.	£ s. d.
Iron ores.....	1 10 0	1 12 0	1 12 0
Coke.....	0 13 3	0 14 0	0 14 6
Limestone.....	0 2 0	0 1 6	0 1 6
Labor.....	0 2 9	0 3 0	0 3 6
Sundries.....	0 1 6	0 1 9	0 1 6
Total.....	2 9 6	2 12 3	2 13 0
	France. Loire.	Spain. Bilbao.	United States. Pittsburg.
	£ s. d.	£ s. d.	£ s. d.
Iron ores.....	1 18 0	0 12 0	1 7 6
Coke.....	0 13 6	1 1 0	0 6 0
Limestone.....	0 1 6	0 1 6	0 1 6
Labor.....	0 3 3	0 3 9	0 2 6
Sundries.....	0 1 6	0 1 6	0 1 0
Total.....	2 17 9	1 19 9	1 17 6

These figures do not allow for depreciation and renewals—which are heavy in the iron industry—for petty charges, or for interest on investment; and, when these are added, it will be pretty evident that, at the present prices of raw materials, pig makers who have to purchase their supplies in the open market are hardly likely to make a good thing of it. On the other hand, it will be understood that most makers obtain their supplies under more or less special circumstances, such as contracts of old standing or the ownership and the working of their own mines. It remains to be seen how far Spain and the United States may in the future push their natural advantages. Both countries have recently been exporting increasing quantities of pig iron, and it would not surprise us if more were done in this direction.

## Notable Australian Steel Contract.

A MELBOURNE correspondent of the *New York Commercial* writes: Nothing has caused a greater flutter in commercial as well as political circles here during the past few weeks than the acceptance of an American tender for the supply of about 13,000 tons of steel rails to the railways of the Colony of Victoria. The people of Australia have been accustomed so long to see their big contracts taken up by English and continental firms that the success of an American firm in big tendering has quite astonished the natives. And the success is no mean one. There are those who are raising the imperialistic cry and urging that the British manufacturer should not be flouted, even though his tender be some \$20,000 above the American. But the Commissioner of the Victorian Railways is a hard headed business man, and he is not likely to sacrifice \$20,000 on the altar of patriotic sentiment. English tenderers were given a fair chance in competition, and they were hopelessly beaten by an American firm. That is the view of the Railway Commissioner.

These are the facts: The Commissioner of Railways in Victoria some time ago decided to relay large portions of existing lines with new rails, substituting heavier steel rails for lighter iron rails. The first contract for 100-pound and 80-pound steel rails, to the number of 10,500 tons was, secured by the Barrow Steel and Moss Bay Steel companies of England at £5 13s. per ton. This contract has nearly run out and a fresh one was invited for the supply of 12,780 tons of steel rails, together with the fish plates, 14,030 tons in all. The tenders were open to all the world, and five were sent in. Two of these were American, two English and one German. One of the American tenders (that of the Carnegie Company) was declared informal. The other (that of the Pennsylvania Steel Company) was successful. The amount of the tender was £75,471, or about \$397,350. This was the lowest. Next came the two English tenders at £79,214 and £81,256 respectively, or a difference in favor of the American tender of £3,803, which is a pretty substantial amount. As compared with the former contract let to an English firm of £5 13s. per ton the American contract works out to only £4 19s. 9d. per ton on exactly the same specifications, so that the Victorian Railway Commissioner has done a good thing by taking the American tender. The whole of the 14,030 tons has to be supplied in twelve months—3,505 tons within six months after signing the contract, 3,510 tons within nine months, and 7,015 tons within twelve months. The first lot of rails is expected to reach Melbourne about September next.

This is the first time a big railway contract has gone to America from Australia.

## Russia Orders Warships from American Shipbuilders.

THE Cramp Shipbuilding Company recently received cable advices from Mr. Charles H. Cramp, its president, now in Europe, to the effect that contracts have been signed between the Russian Government and himself for the construction of two important vessels. One is a battleship of, approximately, 12,500 tons displacement, to have a guaranteed speed of eighteen knots per hour throughout a trial trip of twelve hours' duration at load draught and carrying 1,000 tons of coal. The other is a protected cruiser of about 6,100 tons displacement, to develop a speed of twenty three knots per hour under the same trial conditions as those just stated and carrying 725 tons of coal.

This is said to be the first award of a contract for the construction of a battleship to be built abroad in the history of the Russian navy, and the protected cruiser is also the largest and most important vessel of that type ever ordered by the Russian Government in any foreign shipyard.

**Rails for the Klondike.**—Fifty cars of rails, to be used in constructing the first railroad to the Klondike gold fields, were shipped by the Illinois Steel Company a few days ago. These rails constitute the first consignment forwarded to fill a large order given by the builders of the Klondike line. Other shipments will be made as fast as the steel can be rolled.

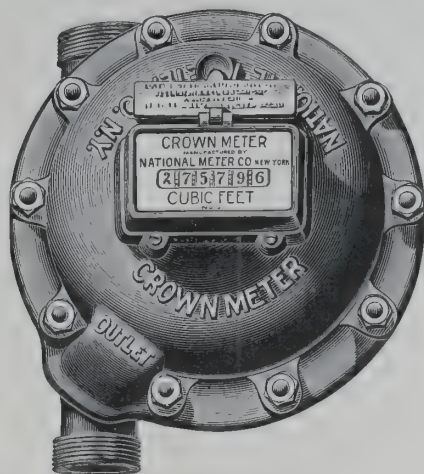
The shipment will go forward over the "Soo" and Canadian Pacific Railroad to Vancouver, and thence by boat to the coast of Alaska. The rails weigh 45 pounds to the yard and are what are called the medium-weight type.

**Creating a Demand for Inventions.**—The cook who has used a fork for egg beating is satisfied until she has seen a rotary egg-beater. The peasant who plows with a crooked stick is content till he sees a mold-board plow; if reaping with a sickle he is satisfied till he sees a modern harvester. The seamstress who has worked with a needle gets along till she sees a sewing machine. The clerk who uses a pen knows no better till he sees a typewriter. These are but types of thousands of similar things which the inventive genius of the American people has evolved and which foreigners will want as soon as they learn their superiority.



Interesting Information for Water Works Officials about

# WATER



# METERS

They measure correctly the amount of water passing through a pipe.

**They increase the revenue,  
Restrict the waste,**

and assist in maintaining a uniform pressure in the water main.



We have many letters of similar character, copies of which we would be pleased to mail you.

## NATIONAL METER CO.

118 CHAMBERS ST., NEW YORK.

**The Largest Water Meter Manufacturers in the World.  
Over 191,000 in Service.**

[MAY, 1898]

City of Highland Park, Illinois.

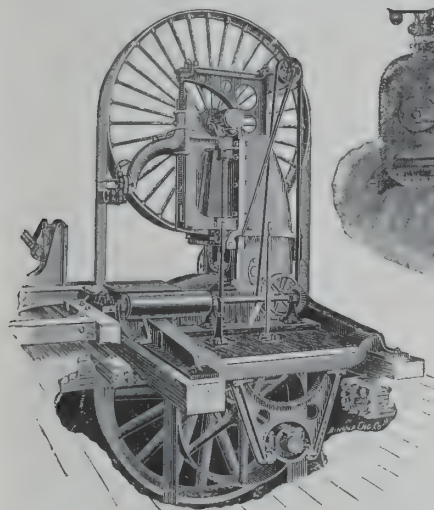
NATIONAL METER CO.,  
298 Broadway, New York.

GENTLEMEN:

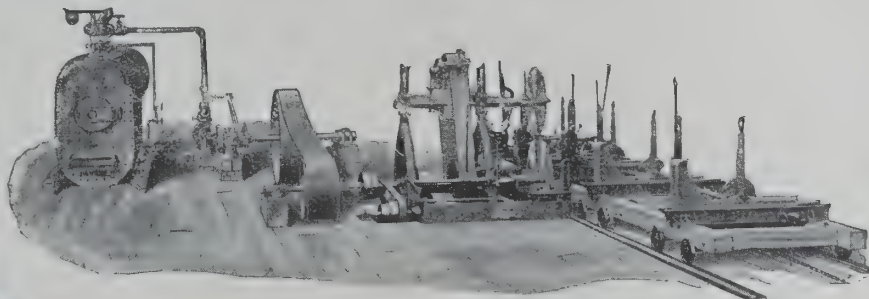
Replying to your favor of the 3d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN.  
Chairman of Water Committee.



Band Mill.



60 or 100 horse power mill. Portable Saw Mills from 12 to 100 horse power.

## LUMBER MAKING MACHINERY.

THE MOST MODERN.

BAND MILLS—6, 8 and 9 foot wheels.

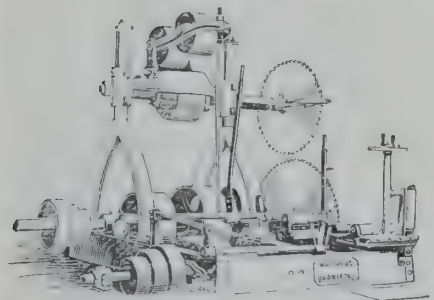
CIRCULAR MILLS—All sizes. Suitable for handling any size and kind of timber.

BAND RE-SAWS—For Saw Mills. Increase largely quality and quantity of daily output.

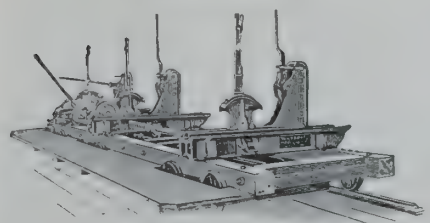
STEAM-ACTING SAW MILL APPLIANCES.  
PULP WOOD MACHINERY.

BARKERS—With automatic turner; one man barks 15 cords, 10 hours.

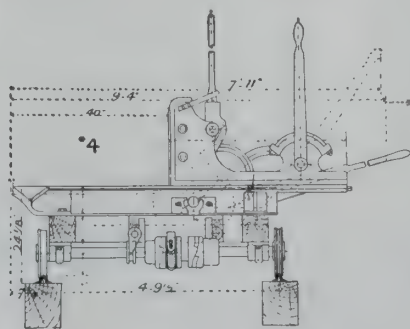
AUTOMATIC CUTTING-OFF SAW—2 men with this machine cut 60 cords of pulp wood 16 to 24 inches long, or 100 cords 48 inches long in 10 hours, taking logs from water and delivering cut wood to conveyor.



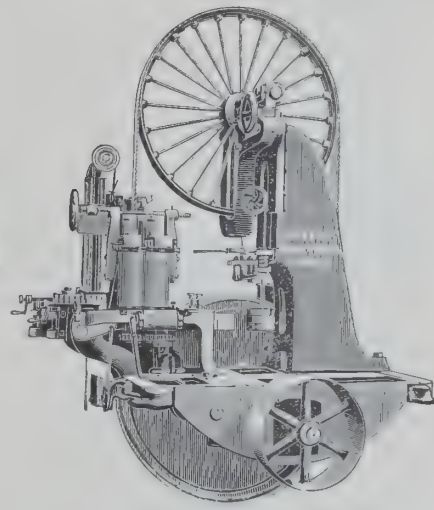
Saw Frame No. 3.



No. 5 Log Carriage.



No. 4 Carriage, showing Off-set for Band Saw.



Band Re-saw.



Established 1844.

New Works, 1896.

WET GRINDERS.  
WET MACHINES, SCREENS,  
WOOD CHIPPER,  
CABLE and CHAIN ELEVATORS and CONVEYERS.

A successful experience of over 50 years is your inducement to correspond with and purchase from us. Long experience in the export trade insures satisfaction. Plans and competent men furnished. Address

## WATEROUS, BRANTFORD, CANADA.

Ask for Quotation and New Catalogue.

"LIEBER" and "A. B. C." Codes



### Review and Forecast of the Lake Superior Iron Ore Trade.

THE output of iron ore by the five ranges composing the Lake Superior iron district was larger in 1897 by over 2,000,000 tons than in any previous season, reaching the enormous total of 12,500,000 gross tons of 2,240 pounds each : The 1896 ore output was 9,934,828 tons, while in 1895, the big season previous to 1897, the production reached 10,429,037 tons. The total ore production from the first shipment to December 31, 1897, was 119,991,694 gross tons. The growth of this great industry, the foundation of the American iron and steel trades, is best shown by the figures of total production up to and including the dates following :

Year.	Tons.
1854 .....	3,000
1860 .....	265,547
1870 .....	3,734,211
1880 .....	14,748,169
1890 .....	57,047,257
1897 .....	119,991,694

By ranges the production to date has been approximately as follows : Marquette, 50,000,000 tons ; Menominee, 24,000,000 ; Gogebic, 23,000,000 ; Vermillion, 10,000,000 ; Mesaba, 12,000,000. The Marquette range was opened in 1847, the Menominee in 1874, the Gogebic and Vermillion in 1884 and the Mesaba in 1892.

The annual production exceeded one million tons for the first season in 1873, when 1,162,458 tons were shipped. The panic of 1873 reduced the output materially, and it was not until 1879 that the output of 1873 was exceeded. In 1881 the two-million-ton mark was passed, with an output of 2,295,618 tons, or more than double the output of 1878 but three years previous. Not until 1886 was the three million mark reached. The progress of the past 12 years is best shown by the figures of production :

Year.	Tons.
1886 .....	3,565,144
1887 .....	4,762,103
1888 .....	5,063,877
1889 .....	7,292,643
1890 .....	9,003,725
1891 .....	7,071,053
1892 .....	9,072,241
1893 .....	6,065,716
1894 .....	7,748,223
1895 .....	10,429,037
1896 .....	9,913,151
1897 .....	12,500,000

The figures show an expansion in business between 1885 and 1890 almost without a parallel, the product of the latter year being almost quadruple that of the former, but five years before. The exact output of the five ranges last year and a careful estimate of their probable output for 1898, approximated in round numbers, are appended as follows :

Range.	1897. Tons.	1898. Tons.
Mesaba .....	4,280,873	5,500,000
Marquette .....	2,715,035	3,000,000
Gogebic .....	2,258,236	2,750,000
Menominee .....	1,937,013	2,250,000
Vermillion .....	1,278,481	1,500,000
	12,469,638	15,000,000

There is no doubt that each of the ranges could, under pressure, turn out a materially larger output than is named under the 1898 estimate. The American importation of foreign ores during 1896 amounted to but 776,283 tons, a considerable falling off as compared with former years. The figures for 1897 importations show a further decline to 543,241 tons, a falling off of over 200,000 tons in a single year. Owing to their great richness, extent and advantageous location, the mines of Lake Superior furnish much more than half the ore smelted in the United States, and the history of the lake mines for the past quarter of a century is largely an epitome of the entire American iron trade.

### Andrew Carnegie's Tribute to Sir Henry Bessemer.

ANDREW CARNEGIE, who has been spending the Winter at Cannes, writes from that place to the *Iron and Coal Trades Review*, of London, as follows :

"You ask me to say a few words upon the great King of Steel who has just passed away. In all parts of the world the news of his death will be received with sorrow, and will awaken feelings of gratitude to the man who made steel so cheap ; but only those who knew him can know how much they have to mourn in the loss of the man himself, and to those who sat in council

with him the loss will be felt as irreparable. One of the chief pleasures of the council meetings of the Iron and Steel Institute was to see the entrance of 'Bessemer' and feel his presence ; the proceedings seemed to possess an air of greater dignity after he took his seat. The king himself was among us. Each succeeding year we were more and more grateful to be privileged to sit with him again, for there always arose the fear that this might be the last. Alas ! the last has passed, and the forthcoming meeting in May is robbed of its chief charm. He sits with us no more ; but it will be long indeed ere the surviving members of council are not reminded each recurring year of what they have enjoyed in days gone by.

"You suggest I should speak of his services to the world, and especially to America ; but it is difficult to set a limit to the influence exerted through almost all branches of material progress by the Bessemer process. To the Republic especially it seems almost to have been a necessity. Without Bessemer steel rails the development of the great West would have been greatly retarded. We found upon some portions of the Pennsylvania Railroad, of which I was then superintendent, that iron rails in some of the sharp curves became useless in six weeks. We were driven to purchase steel made in the ordinary way, and I well remember that the cost of the first small lot of steel rails that we purchased in Sheffield was \$256 per ton. We have made and sold hundreds of thousands of tons since for \$16—one-sixteenth of the ante-Bessemer price. Last year five and a half millions of tons of Bessemer steel were made in the United States ; about as much more must have been made in other parts of the world. What Bessemer steel has done for the United States up to this time may be partly computed, but what cheap steel is yet to do for the Republic will, I believe, exceed the most sanguine estimates, for this is the chief element in those branches of manufacturing which contribute most powerfully to the material advancement of nations. Indeed, the nation which produces the cheapest and best steel might almost be said to have the foremost place in manufacturing within its grasp.

"Hargreaves's spinning jenny, Arkwright's power loom and Whitney's cotton gin did much good for the world, but through Bessemer millions of tons of steel billets have been sold in the United States without loss during the past three years at \$15 (and slightly less) for 2,240 pounds, exactly three pounds for 2 cents. How shall we estimate the service to the world of that man upon whose monument it can truthfully be inscribed : 'He made it possible for three pounds of steel to be sold for a penny ?'

"But to those who had the pleasure of knowing Bessemer the thoughts of even this great service fade away to-day in affectionate remembrance of the man—the tall, dignified, courtly, kindly gentleman, who won all hearts, and whose passing away from among us robs the bright sunshine this morning of its wonted charm, making it unwelcome, as something out of place and discordant with our feelings."

### Great Call for Machinery in England.

IT is astonishing how much machinery is in demand, and how difficult it is to get it. You have already been informed of the various clever Yankee notions which have been brought to Sheffield, and are now being freely used at some of our works. The principal of one of our largest firms in the tool trades took me over his works the other day. I found them packed full, without an inch of space to spare, with some of the most perfect labor saving appliances to be found anywhere, several machines being under the charge of a single "minder." Crossing his yard we entered a very large place newly built. There was only one machine, and that was waiting for some of its parts. The owner told me that he had all his life been standing out against the use of foreign-made machinery, but after trying in all our leading engineering centres to get what he wanted for his work, he found himself unable to do so, and his partner was at that time in London seeking to purchase from the London representative of an American house as many of their machines as they could give him. These American-made machines, he tells me, are considerably dearer than those made in England, so far as concerns his own trade ; but they are very perfectly made, and do their work to his utmost satisfaction. So great was the demand that his partner was exceedingly doubtful about getting anything like the number of machines they required. It is evident that there is a great opportunity for extending the production of labor saving inventions in this country. The close of the engineers' strike, giving greater freedom to employers in the internal management of their works, is certain to accelerate and extend the use of machinery which up to now has been "slow-timed" by restrictive trade union regulations.—*From Sheffield Letter of the Hardware Trade Journal.*





Absolutely noiseless,  
Immediate and strong siphonic action,  
With a cistern valve that can be regulated  
for any discharge,  
Every part constructed of best known materials and workmanship

DESCRIBES THE

## MAELSTROM

Water Closet,

which represents the greatest improvement  
in sanitary appliances, made by

## OWEN & SALTER

MANUFACTURERS OF

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and Water Closets,

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## JAMES H. TARR,

MANUFACTURER OF

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## Copper Paint

"Yacht Composition"

AND

"Green Racing  
Composition"

for wooden bottoms.

"Marine Iron" Paint

for the bottoms of  
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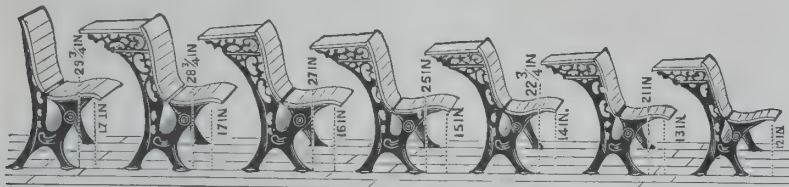
These Paints are acknowledged the best manufactured for their respective uses.

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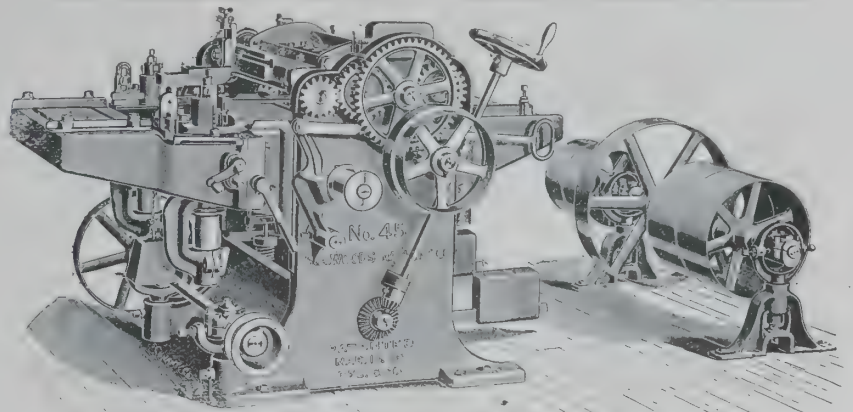
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OUR FURNITURE HAS MADE GRAND RAPIDS FAMOUS.

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GRAND RAPIDS, MICH.  
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JERSEY CITY, N. J., U. S. A.,

MANUFACTURERS OF

Woolsey's Copper Best Paint,

Woolsey's Domestic Kalsomine,

Woolsey's Coach and Car Colors,

Woolsey's Wood Stains, Wood Filling, etc.

### Copper Best Paint

FOR THE PRESERVATION OF THE  
BOTTOMS OF WOODEN  
VESSELS.

TESTIMONIAL.

From DEVONPORT FERRY CO., L'd  
Auckland, N. Z., May 20, '91

To C. A. WOOLSEY PAINT  
AND COLOR CO.,  
Jersey City, N. J., U. S. A.

Gentlemen—I have great pleasure in recommending Woolsey's Copper Best Paint. I have used it on my Company's steamers for a number of years past, and it has given entire satisfaction.

The Devonport Ferry Company's steamers "Britannia," "Victoria," "Alexandra," "Takapuna" and "Tainui" are now coated with Woolsey's Copper Paint over Metal Sheeting.

Faithfully yours,

ALEX. ALISON, Manager.

### "KALSOMINE."

Our Kalsomine is made of the best selected material and the tints and colors are particularly brilliant and clear. We are selling large quantities in the foreign markets with gratifying results. Send a sample order. You can make no mistake, for it is the best Kalsomine in the market.

### COACH

—AND—

### CAR COLORS.

GROUND IN JAPAN.

TESTIMONIAL.

CHARLOTTE, MICH.,  
March 17, 1890,

C. A. WOOLSEY,  
Dear Sir:—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Greens are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

Yours truly,

MAY & BARNEY.

## "NEW JERSEY" COPPER PAINT

LEADS THEM ALL,

So our Testimonials Say.

We guarantee this Copper Paint to be the easiest to apply and, owing to its being so finely ground, it is the smoothest paint in the market.

Highest Medals from American Institute, New York City.

**NEW JERSEY RED COPPER,**

For Yachts. Brightest Color Made.

**NEW JERSEY SEAM PAINT,**

A Perfect Substitute for Pitch.

## NEW JERSEY PAINT WORKS,

HARRY LOUDERBOUGH, Proprietor,

JERSEY CITY, N. J.

U. S. A.

REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of NEW JERSEY PAINT WORKS, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—it is in splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.

MILLS EDWARD Master Schooner "Florence Shay."



## AMERICAN RAILWAYS THROUGH ENGLISH EYES.

THE London *Times* publishes a second article, entitled "A Traveller's Notes on American Railways." The first, which we reprinted in part in our April number, treated of speed and punctuality; this of organization. The writer says in part:

If I were asked to give in one sentence the reason why American trains in spite of great difficulties are excellently punctual, I should say it was because punctuality is insisted on. The public expects punctual trains, and public opinion is more prompt in formation and more imperious in action than with us. The railway companies do their business on very fine margins, and competition is so keen that no company dares to get a reputation for unpunctuality. Consequently, instead of engines being sent out, as often happens here, with trains that they are evidently and notoriously incapable of hauling to time, engines are built powerful enough, to use a common phrase, to play with their trains. I stood one night on the platforms of the huge Union depot at St. Louis, where the trains of twenty-two different companies converge, and watched one express after another steam out. Many of them weighed at least 400 tons, most of them certainly over 300. Yet not once did I see a driving wheel slip at starting. Again, luggage, the *bête noire* of railways in all countries, seems to me to be handled more smartly. The baggage cars are of adequate size with adequate-sized doors—sliding, of course, not hinged—and instead of the arrangements being left, as with us, to no one in particular, there is on each train and at each station a baggage master, whose special duty it is to see that the baggage to be put on or to be put off is so arranged before the arrival of the train that it can be transferred with a minimum of delay.

Further, the running of each train is controlled all the way from a central office. With us it is left in the main to the individual signalman to settle whether to shunt a coal train at his box, or let it go on a stage further in the hope that the express will not overtake it and be checked. If the signalman makes an error of judgment, there is no doubt an inquiry and a subsequent report. But the mischief is done, and overworked officials are prone to let bygones be bygones. According to normal American practice there would be a chief train dispatcher, say, at Euston, regulating the movement of all trains down the Northwestern main line as far as Rugby. Under him there would be an adequate staff of assistants, each in special charge of a group of perhaps six trains. The progress of each train is reported by telegraph every few miles and plotted down by the particular clerk concerned on a schedule in front of him, side by side with the normal times of the booked working. Thus the whole train movement is mirrored in the office, and the dispatcher, with a full knowledge of the position of affairs over a considerable area, and with an intelligence presumably superior to that of the roadside signalman, can give orders for any necessary shunting, relief running, and so forth. There is a further advantage. The dispatcher, being responsible for his trains, can in any case where delays and difficulties tend to become chronic at once call the attention of his chief and suggest the remedy which should be provided. Every business man knows the difference between a continuous and a periodical or occasional audit, and this is practically the difference between the American system of punctuality control and our own.

... An American railway represents "one-man power" much more than anything with which we have to do in the railway world here. And, just as we have seen "one-man power" in this country pull down a great banking house in spite of a position and a prestige almost equal to that of the Bank of England, so in America an incompetent, reckless, still more, a dishonest, president can in a few years bring the most solvent railway company into the hands of a receiver. Given, on the other hand, the ideal president, shrewd and far-seeing, firm and yet conciliatory in dealing with the public and the public authorities, and honest not only in being above mere pecuniary temptation—most of them are that nowadays—but in refusing to sacrifice the future of the undertaking to the present—given such a man, and he can do more for his company than any one man here, be he chairman or general manager. For to his colleagues, the directors, he speaks as an equal—or, indeed, as more than an equal, in that as a rule, though the Vanderbilt companies are an exception, he is their chairman—while at the same time he dominates them by his superior knowledge of railway matters in general and of their own railway in particular. And if, on the one hand, he shapes the policy of the board, on the other, he disposes absolutely of the services of every member of the executive staff and moves his men about like chessmen till he has fitted each into the place best suited for him. I came, for example, upon a case of an officer of exceptional ability, retained in a nominally subordinate but very important post, who was receiving the normal salary of his position through the ordinary pay rolls and as much again by checks passed through a special account.

I must return later on to the difference between English and American ideas as to dividends and "betterments." Here it is only necessary to notice it as illustrating the enormous power of the American president. For it is clear that no English chairman or general manager could enforce upon the shareholders a policy of year by year limiting the dividend to a point far below what the actual net earnings of the undertaking would justify. So, too, the ideal president can naturally get better results out of his railway when staff and methods of operation can be shifted and molded at his sole discretion than where the management is, so to speak, put into commission. There is, however, another point to be mentioned. The president is chairman and managing director; he is not general manager of his line. With us a general manager is forced to combine two incompatible functions. He is, first, the active executive head of a huge organization, with his time more than fully occupied with matters of daily routine working. And, secondly, he is called on to stand outside and detached from that organization, to see what changes of circumstances threaten its stability, in what new direction it should naturally develop, or what new methods may improve its functional activity. It is as though, to adopt a military simile, the same officer were expected to be at once chief of the general staff and division commander. In practice, strength and energy being limited, one side or other of the work is bound to be relegated to the second place, to the no small injury of the railway company. Compare this with the organization of a great American company like the Pennsylvania. There is a president, entirely free from routine administration, whose whole time is devoted to questions of general policy and large schemes of extension or improvement. Under him are three aides-de camp, entitled "assistants to the president," men of high position and ripe experience, who can examine and inquire and report with authority if any new subject requires an exhaustive investigation. Then there are three vice-presidents, of whom the first is in charge of the finances, while the second and third divide between them the control of what we call the traffic. For in America, as in Continental countries, what with us is a single department is split into "traffic" and "operation" (*service commerciale et exploitation; Verkehr und Betrieb*); and the second vice-president is accordingly responsible for the relations between the railway company and the public; while the third presides over the actual handling of the traffic which his colleague procures for him. None of these gentlemen has any regular executive work. That is carried out by their subordinates, the responsible heads of departments, the auditor, accountant and comptroller, the general freight and passenger agents, and the general manager, assisted by the heads of the engineering and motive-power departments. Even this hardly exhausts the list of officers engaged to do nothing but think and study improvement, for, to quote one instance, there is, besides the working head of the motive-power department, a "chief of motive power," who is relieved of all responsibility either for the manufacture, maintenance or running of the locomotives, and practically occupies the position of consulting mechanical engineer, advising his company as to the new designs and methods required to meet the constantly changing conditions of railway life.

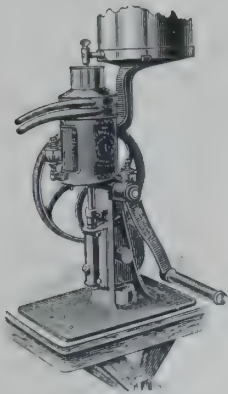
It may be objected that all this headquarter staff is expensive, and though a few hundred thousand dollars are not of much account to the great Pennsylvania system with a revenue of over eighteen millions sterling per annum, it doubtless does cost money. But that the money is well spent no one can doubt who has seen the results. In the last thirty years our English methods of operation have remained practically stationary, and our English railway rates have fallen so little that the outside public doubts whether they have fallen at all. During the same period the average receipts of the Pennsylvania have fallen from 1d. per ton per mile to only a fraction over  $\frac{1}{4}$ d. Yet methods of operation having been simultaneously improved, the Pennsylvania was able at the end of a long period of unexampled depression, after spending £300,000 out of revenue on permanent improvements and carrying over a balance of £160,000, to announce to its shareholders a distribution for the year 1896 of the not unsatisfactory dividend of 5 per cent.

**Steel Rails for Russia.**—The Pennsylvania Steel Company recently concluded a contract with the Russian Government for the delivery of 35,000 tons of steel rails, which are to go to Vladivostock, and are to be used in the construction of the Trans-Siberian Railroad.

This is one of the largest orders that has been given for a long time, and, as it takes 110 tons of 75 pound steel rail to a mile, there are enough rails in this order to construct over 300 miles of road. The contract calls for speedy delivery, and the company will push the order through. The rails are to be delivered to the Russian Government at Philadelphia, and it will not be long before the first shipment is made. It is understood that a good price was obtained.



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Immediate and absolutely complete separation of cream from milk by machinery.

125,000 machines in use in every country in the world.

A saving of 10 to 20 per cent. in any climate, and 25 to 100 per cent. in warm countries.

Perfect separation and greatly improved quality of products.

Machines simple, durable and easily operated.

SATISFACTION GUARANTEED.

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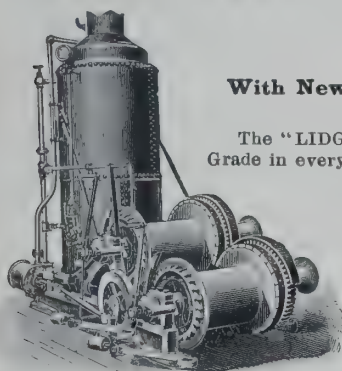
Hand or Power. Any Capacity.

Address for catalogue or any desired particulars,

**THE DE LAVAL SEPARATOR CO.**

General Offices, 74 Cortlandt Street, New York.

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With New Improved Patent Friction Drum.

The "LIDGERWOOD" Hoisting Engines are strictly High Grade in every particular and accepted as the STANDARD Modern High Speed Hoisting Engines, both as regards High Duty and Economy, Durability and Simplicity, combined with Ease and Rapidity of Operation.

FOR PILE DRIVING, BRIDGE AND DOCK BUILDING, MINING, RAIL ROAD AND CONTRACTORS' USE.

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Warerooms: 96 Liberty Street, NEW YORK, U. S. A.

# Pierce Well Engineering & Supply Co.

123 Liberty St., NEW YORK, U. S. A.

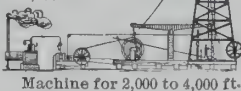
Cable Address, "Artesianos, New York."

Manufacturers of everything required to drill and complete Wells for

**WATER, OIL & GAS.**

Any depth from 25 to 5,000 feet.

Also, Special Tools for Soundings and Test Borings for Water and Mineral Prospecting and Developing Mines; Light, Portable Outfits operated by Man Power. We furnish Pipes, Casing, Sucker



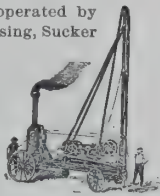
Machine for 2,000 to 4,000 ft.

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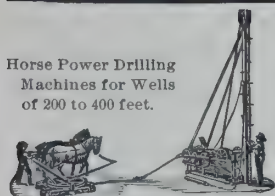
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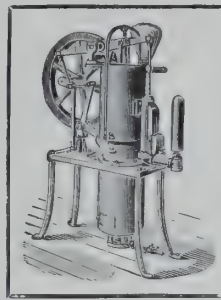
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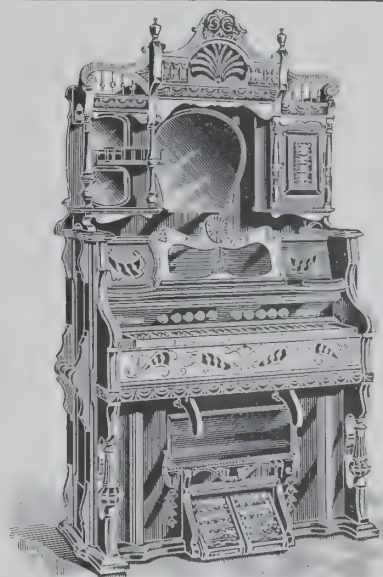
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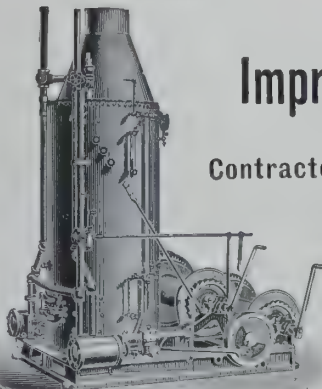
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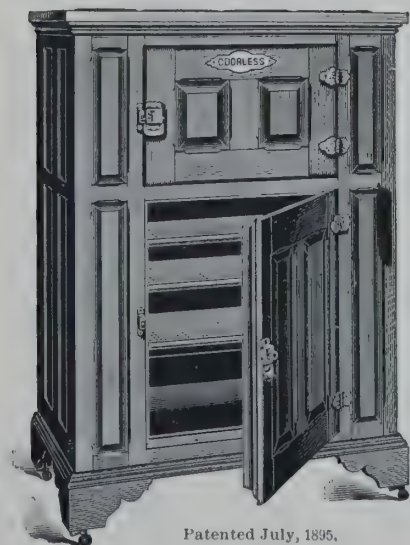
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## THE PROGRESS OF THE UNITED STATES.

MICHAEL MULHALL'S book on the "Industries and Wealth of Nations," as its name implies, is a publication devoted to the statistical presentation of the progress of the countries of the globe. It is filled with allusions to the rapid advance made by the United States, some of which will be apt to astonish even those persons who keep track of such things. Space will permit us to make only a few brief extracts from this striking work. All of the statements which we quote baldly and alone in this way are in the original work substantiated by columns and pages of carefully compiled statistics as well as supported by Mr. Mulhall's widely recognized authority as a statistician.

The United States produces about one third of the manufacturing total of nations, as they do also of grain and meat, while their population is less than one-sixth.

The value of American manufactures is about £1,464,000,000, or the value of British and French manufactures conjointly. American manufactures have multiplied just twentyfold since 1840, while those of Europe have only doubled.

In 1840 the United States held the lowest rank as regards textiles among the four great manufacturing nations, but since then the Union has passed both France and Germany in the race and bids fair to rival Great Britain ere long. Fifty years ago Great Britain produced more than half of the world's supply of iron, her share at present being one fourth; she holds, moreover, the second place, her production being much less than that of the United States. Down to the year 1860 France held next place after Great Britain, producing twice as much iron as Germany, but now the position of these countries is reversed, the make of iron in Germany being double that of the French. Comprehending under the term hardware all manufactured goods in which iron, steel, copper or other metal forms the chief component, it may be said that Great Britain makes one-fourth, the United States one-third and other nations the remainder.

The story of our progress in manufacturing is matched by that related by Mr. Mulhall of our mining industry. Fifty years ago it was insignificant in comparison with that of Great Britain, but now in point of value no country approaches the United States, while, as regards weight, Great Britain raises one third, the United States one third and all other nations collectively one-third of the minerals of the world.

One of the most striking passages in Mr. Mulhall's book is that relating to the railway traffic of the United States: The total haulage of the railroads of the world on the mean of 100 miles amounted to 4,530,000 tons daily, the United States standing for almost two-thirds. \* \* \* So prodigious is the goods traffic in the United States that the railways carry every day in merchandise a weight equal to what the whole population of 70,000,000 persons would amount to if they could all be placed in a single train.

Of internal trade Mr. Mulhall says: "Internal trade is much more important than external trade, and presents the best gauge of a nation's industry and prosperity." Internal trade is the real trade of a country, comprising the total value of agricultural, manufacturing and mining products handled by the people, and the value of imported goods that are consumed. The amounts in 1894 were approximately as follows:

United Kingdom.....	£1,610,000,000
France.....	1,201,000,000
Germany.....	1,353,000,000
Russia.....	1,030,000,000
Other states of Europe.....	2,508,000,000
Europe.....	£7,702,000,000
United States.....	3,125,000,000

According to Mr. Mulhall's figures these are the stages of the growth of wealth in the United States:

Year.	Population.		Per inhabitant
1850.....	23,200,000	£ 1,486,000,000	£ 64
1870.....	38,600,000	5,010,000,000	130
1890.....	62,600,000	13,550,000,000	216
1895.....	69,700,000	16,350,000,000	234

The figures showing the expansion of British wealth presented by Mr. Mulhall do not permit us to parallel this table, but he tells us that in 1860 the wealth of Great Britain was £7,206,000,000 and in 1895 it was £11,806,000,000. This shows an increase of £4,600,000,000 in 35 years, whereas the increase in the United States during the past 25 years amounted to £11,340,000,000, the addition being nearly as much as the total wealth of England in 1895.

Passing from manufactures, mining and trade to farming, Mr. Mulhall gives us an interesting glimpse of our operations in the field of agriculture. He tells us: If the economy of labor was as well understood in all countries as in the United States, where each hand cultivates 21 acres, the tilled area of

Europe would be two and one half times as great as it is. Having remarked this significant fact, he proceeds to state that at present the United States raises one-third of the food produced in the world, and he proceeds to show the figures. Here is the table showing the annual value of our agricultural product from 1840 to 1893:

	1840.	1866.	1880.	1886.	1893.
Exports...£	19,000,000	53,000,000	143,000,000	101,000,000	128,000,000
Home use	161,000,000	367,000,000	556,000,000	674,000,000	685,000,000
Total...	£180,000,000	£420,000,000	£699,000,000	£775,000,000	£813,000,000

This series of quotations must for the present end with the following regarding the condition of labor in America: "On the whole the condition of the working classes in the United States seems much better than it was 40 years ago; the average wage per operative rose from £51 in 1850 to £101 in 1890, an increase of 98 per cent., while the output per operative rose only 88 per cent., namely, from £220 to £414. The total earnings for 1894 are equal to £44 per inhabitant, against £36 in the United Kingdom. It is to be observed that earnings in the United States have increased much faster than population, the ratio in 1849 being only £17 per head."

## The Cheapening of Pig Iron.

"WHEN we compute the value of the pig iron produced in 1897," says the *Philadelphia Record*, "we meet with an unexpected result. The value of the output of the past year was about \$50,000,000 less than the value of the pig iron produced in 1890, though the quantity of the production in the latter year was half a million tons less than in 1897. The output in 1890 was 9,202,703 tons, and the value, as shown in the statistical abstract of the report of the American Iron and Steel Association, was \$151,200,410, an average of not quite \$16 50 per ton. Assuming that the average value in 1897 was \$11 per ton (about 50 cents more than the average in 1896), the total value of the pig iron output in 1897 would be \$106,129,480. This estimate is, if anything, higher than the facts warrant, for the largely increased output of pig in 1897 in the South, which was sold at very low prices—as low as \$6 per ton—probably reduced the average price below that of 1896, in which case the value of the product did not quite reach \$100,000,000. The Bessemer pig iron producers have taken preliminary steps to form a Bessemer pig iron pool to control the price of that product. There is reason to believe that they will be successful, because the producers of this kind of pig iron are also consumers on a large scale. Bessemer pig iron is chiefly used for conversion into steel by the Bessemer process. Some of it is cast into ingot molds, but these are used only by the steel makers. This embryo trust has not, so far as can be learned, undertaken to control the production of pig iron for other purposes than the making of steel, and it is very doubtful whether any pool with such an object in view could be successfully formed."

## English and American Prices in Iron and Steel.

IN a paper read before the South Staffordshire (England) Institute of Iron and Steel Works Managers, A. P. Head made an interesting comparison of American and English prices in the iron and steel industry. He said:

"As will be seen from the following table in which current prices at Pittsburgh and Middlesborough (England) are compared, both raw materials and finished goods are cheaper in America, with the exception of labor, per week Labor per ton, however, is in many cases also cheaper, thanks to labor saving devices:"

COMPARISON BETWEEN AMERICAN AND ENGLISH PRICES.

	United States (Pittsburg.)	United Kingdom (Middlesborough.)
	Price per 2,240 lbs.	Price per 2,240 lbs.
Iron ore, Bessemer.....	11s. 6d., 63 per cent.	14s. 9d., 50 per cent
Coke for smelting.....	6s. 6d., Connellsville.	13s. 6d., Durham.
Steam coal.....	3s.	3s. to 8s. 3d.
Pig-iron, Bessemer.....	40s.	50s.
Pig-iron, non Bessemer..	38s. 9d.	40s. 9d.
Steel billets.....	£3 1s. 8d.	£4 0s. 0d.
Heavy rails.....	£4 1s. 4d.	£4 10s. 0d.
Iron bars, common.....	£4 12s. 0d.	£5 6s. 0d.
Steel plates, ship.....	£4 12s. 0d.	£5 10s. 0d.
Steel plates, boiler.....	£5 10s. 6d.	£6 10s. 0d.
Steel H joists.....	£5 6s. 0d.	£5 17s. 6d.
Labor, unskilled, per week	25s.	19s.
Railway rates, mineral, per ton, mile.....	1-7d. to 1½d.	1d.

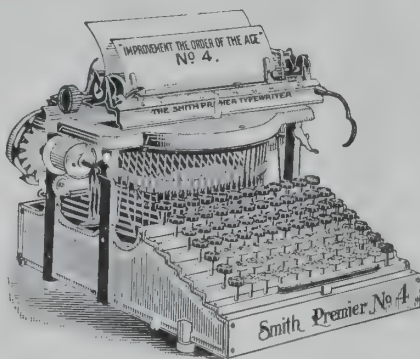


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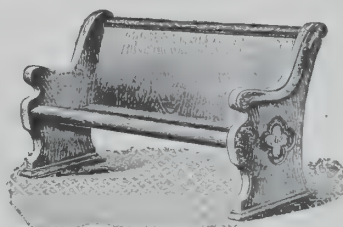
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sizes— $2\frac{1}{16} \times 3\frac{1}{4}$ ,  $2\frac{3}{8} \times 3\frac{5}{8}$ ,  
and  $2\frac{1}{4} \times 3\frac{1}{2}$ ; hard surface  
finish; full packs, 48 cards.

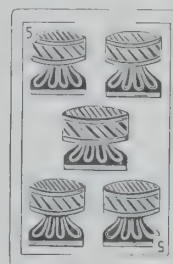
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used in Colombia and  
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all the superior quali-  
ties of brand No. 71;  
made in three sizes  
same as brand No. 71;  
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Barcelona size,  $2\frac{3}{8} \times 3\frac{5}{8}$ ;  
finest parchment paper;  
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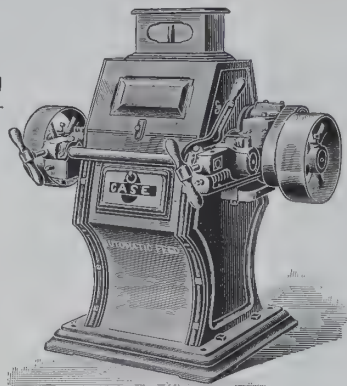
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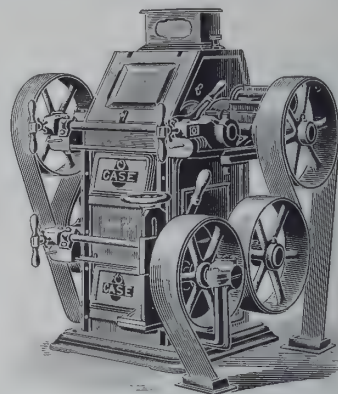


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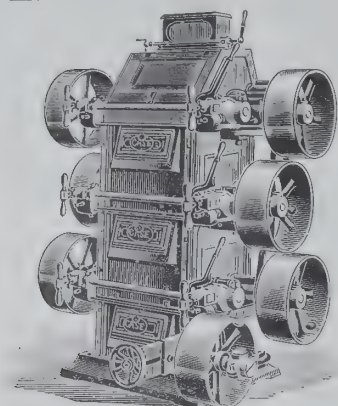
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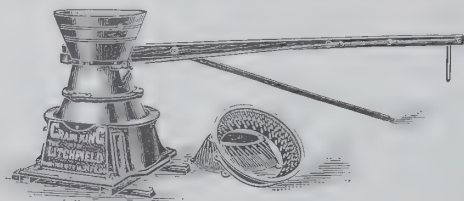
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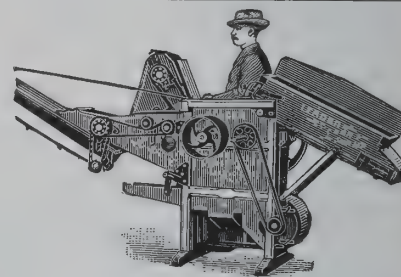
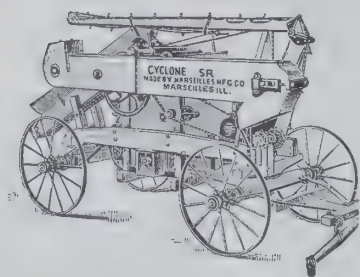
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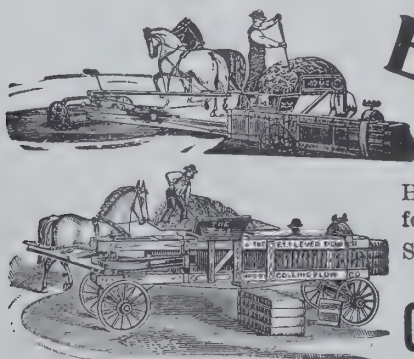
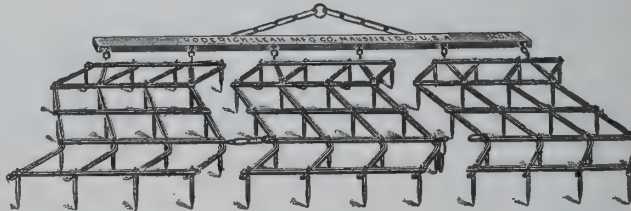
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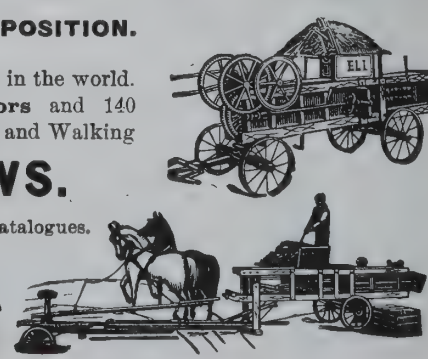
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### Farm Implement Show at Paris.

THIS year's annual implement "show," or Concours Agricole, took place in the Palais de Machines on the Champs de Mars, opening on the 9th and closing the 15th of March; but, unlike last year, the arrangements of the machines and live stock was less convenient for visitors. Instead of continuous rows of machines from end to end and in centre of the vast building, the implements this time were placed in between wooden partitions erected along each side of the building. In these divisions two, three and four firms, variously, had their location, and it was a matter of difficulty all through to know to which firm the machines belonged, the cramped positions making it necessary to economize the room, while the labor of going through the machines was increased immensely by the trouble of having to dodge around all the wooden screens. This unfortunate disposition was perhaps obligatory in view, probably, of some exhibition of a very different kind to follow and necessitating an early erection of those objectionable hoardings which next year, it is to be hoped, may not interfere with the agricultural show's generally excellent arrangements.

As a set-off, however, the steam machinery this time was located outside the building opposite to the military school, and was operated along with its now serious rival, oil and gas machinery. Occasionally something "new" occurred in the way of a casting of newer model or of strengthened proportions, but taking the exhibits as a whole the crop handling machines are essentially those known to all farmers for the last ten years and the cultivating tools for half a century.

When one considers the ceaseless progress in improvements recorded weekly in the United States it is astonishing to find how infinitely few find their way over here. The best explanation may be that, on the continent, labor-saving is of inferior consequence and that the low intelligence of the ordinary laborer is opposed to new things, sometimes needing a little mechanical alertness, and, lastly, the soil at times may render imperative the more primitive and heavier tools in vogue here. While alluding to this absence of American tools it might be well to mention those classes upon which American ingenuity has made immense advance and which are never or rarely ever seen at the French shows. These are threshing machines, traction and plowing engines, separators, the latest types of gearless crushing mills, the latest hay presses, the newest forms of pulverizers, of surface cultivators or riding hoes, the new tine weeders, centre draft mowers, weighers, wagon loaders, wind stackers, hay slings, etc.—From a letter to *The Farm Implement News*.

### American Trade with Mexico.

THE industrial and commercial advancement of Mexico and the general development of the country during the past twenty years has been rapid, indeed. Mr. Lummis, in the February, 1897, number of *Harper's Magazine*, aptly calls Mexico "an ambitious marcher in the procession of nations," and says: "She is no longer old Mexico; while in the United States we have been achieving a material development, she has wrought the political and social miracle of the century. Within less time than has elapsed since our Civil War invented millionaires, Mexico has stepped across as wide a gulf. From a state of anarchy, tempered by brigandage, she has graduated to the most compact and unified nation in the New World. There is progress everywhere—material, intellectual, moral.

"In 1879 there were only 372 miles of railway in the country, the greater part of which consisted of the Mexican Railway, connecting Mexico City with Vera Cruz, and about 5,000 miles of telegraphic communication. In 1883 the total railway mileage had reached 2,800. In 1887 there were open for traffic 3,870 miles, and at the present time there are forty railroads in the republic, with a total of 7,384 miles, and a large number of other roads are being prospected. The report of the Minister of Communications, just issued, gives the total telegraphic communication at 27,900 miles, not including lines belonging to railways.

"Although a large number of new industries are starting up, the country cannot be said to be a manufacturing one, the scarcity of fuel being a great

drawback to manufacturing. The main output consists of minerals and products of the soil. The principal articles of manufacture are blankets, carpets, wool and cotton cloths, prints, underwear, hats, shoes, silk fabrics, soap, and a small quantity of paper. The wool and cotton manufactures have already assumed large proportions, and are rapidly on the increase. Wool is produced in abundance, and a large amount of cotton is grown, but, as yet, not enough to supply the home demand. The deficiency is supplied from Texas.

"For a long time the trade of the country was held by Europe which had the best means of communication. The United States has, however, with the growth of railroads and steamship connection, made strenuous efforts to extend its trade with Mexico, and with the wonderful result shown by the statistics given farther on.

"There is a steady and increasing demand for all kinds of agricultural and mining machinery and implements, pumps, threshing machines, steam engines, boilers, rock drills and a host of other articles.

"In 1873 Great Britain took 39 per cent. of the total exports from Mexico, and sent to that country 34 4-5 per cent. of the total imports. The United States took 36 per cent. of the exports, and sent 25 3-10 of the imports. All other countries, almost entirely European, took 25 per cent., and sent a little less than 40 per cent.

"For the year ending June 30, 1897, Great Britain took something over 12 per cent. of the exports, and sent a little over 15 per cent. of the imports. The United States took nearly 79 per cent. and sent 53 1/2 per cent. All other countries took less than 9 per cent., and sent 31 1/2 per cent."

### Threshing Machines a Preventive of Stones in Wheat.

IN many countries millers experience great difficulty in grinding owing to the presence of stones in the wheat that have got in during the process of threshing by hand still prevalent in those countries. The following letter which we take from *The American Miller* suggests a simple and effective remedy and one that should enhance the market value of the wheat so handled:

I am sending you a fair sample of what comes to the mill in Mexican wheat. It consists largely of hard, black clay and pebble stones. The black dirt gives the miller in this country lots of trouble. Of course, we have the gravel extracting machines and they do good work. The sample I send you shows what they take out. A miller must regulate his fan and see that the dirt don't get into the wheat, but in spite of his closest attention there will be some black dirt come to his first break, and then the middlings are full of black specks.

In some parts of Mexico the farmers pull the wheat up by the roots and then thresh it on the ground with horses and donkeys, and this is the way the black clay and gravel get into the wheat. In some parts of Mexico they are getting American threshing machines, and when a miller gets wheat from a threshing machine he is happy, or at least I am.

### The Canning Industry of the United States.

THE fruit and vegetable canning industry of the United States represents an invested capital of \$15,000,000, with an annual trade of about \$30,000,000, and employs more than 60,000 persons. It is chiefly carried on in two States, Maryland and New York. The fish canning business of this country is carried on at 100 establishments, in which more than 5,500 persons are employed. The value of the canned fish output is \$7,000,000 a year. The chief product in this line is canned salmon, which is mainly put up in the State of Oregon. In the East more than 2,500 persons are employed in fish canning in Maine and 700 in Massachusetts. The oyster canning industry of the United States is conducted in less than twenty establishments, which do a business of between \$3,000,000 and \$4,000,000 a year, employing 3,500 persons. Eighty per cent. of this branch of business is done in the State of Maryland.—*Metal Worker*.

**An English Tribute to American Farm Machinery.**—We do not suppose any one is disposed to question that in two distinct departments of invention the Americans have shown great ingenuity and skill—one is machine-tool construction and the other in the designing of farm implements and machinery. The fact that in the United States agriculture is so leading an industry, has led inventors to bestow especial attention and thought upon the means for cultivating the land, raising crops and harvesting the product; and side by side with ingenuity in designing the best tools for the purpose has gone the effort to produce an economical implement in the variety of its adaptations and facility for making repairs. Hence it is that American implements have acquired among progressive farmers in this country a popularity which is constantly extending and disposing our own implement makers to follow, to some extent, on similar lines.—*The Hardwareman, London*.



## EXPORTS OF OUR MACHINERY.

**G**REAT as has been the increase since 1894 in the exports of iron and steel in the cruder forms, an almost equal development has attended the outward movement of the higher grades of manufactured iron. Given a low cost raw material and an abundance of skilled labor, aided by highly specialized mechanical appliances, the American manufacturer should be in a favorable position to extend his market into foreign countries. The export returns show that he occupies a market by no means commensurate with the advantages he enjoys. Propinquity and similarity of agricultural conditions explain the large sale of agricultural implements and machinery to Canada. The excellences of this class of manufactures give it a large sale in European countries, and the double advantage of special fitness and propinquity to market should give almost a monopoly in the countries of South America.

It is no different with certain other notably ingenious machines and implements manufactured in the United States. The American sewing and type-writing machines and mining, printing and shoe machinery find a ready market all over the world and show no evidence of a loss of popularity through competition with other exporting countries. The direction of gain differs with the different exports. In 1894, the value of sewing machines exported was \$2,064,000, and in 1897 \$3,193,000—a substantial increase, spread over transactions with every commercial country in the world. The great increase occurred in the exports to Europe—\$1,070,000 in 1894 and \$2,099,800 in 1897. American countries hardly varied in their purchases, and elsewhere only Australasia gave a noteworthy increase. Typewriting machines to the value of more than \$125,000 a month are sent out of the country, and nearly 90 per cent. of the demand is from Europe. The market for printing presses and stationary engines is mainly found in England, Canada and Mexico; but Russia and Japan have bought many locomotive engines, and in the last year Russia and Mexico were the best customers for boilers and parts of engines. In general machinery, which includes a very large number of descriptions, electrical, shoe, textile and metal working, about \$20,000,000 is exported, and finds important buyers in England, Germany, Mexico, Japan, Australasia and British Africa. Indeed, British Africa takes nearly as much in value as Germany or Mexico—largely mining machinery.

If machinery of special fitness for a purpose can be produced in the United States at a lower cost than elsewhere, it is only natural to look for a similar advantage in machine-made articles. Nails and spikes are almost entirely machine products, the only survival of the hand-work being horseshoe nails and the quantity of these latter kinds is of no commercial importance. In 1894 the exports of cut nails were 18,323,000 pounds, and of all other, 3,802,000 pounds. In 1897 there were exported 33,771,000 pounds of cut nails, 13,000,000 pounds of wire nails, and 7,000,000 pounds of other descriptions. The largest buyer of our nails is now Japan, more than 40 per cent. of the entire export going to that country. Large quantities are also taken by Mexico, Chili, Australia, and, in ordinary conditions, Cuba. The home productions of wood screws appears to be only sufficient to meet the present requirements of the home market, as the exports are very small, and the imports even smaller, owing to duties intended to be prohibitive. The imports of nails and spikes are chiefly made of wrought iron and steel, but the transactions are small.

The exports of wire have just doubled in quantity since 1894, and now stand at 119,000,000 pounds. The largest demand for this manufacture comes from sheep and cattle raising countries, like Mexico, Brazil, Australia and South Africa. While the movement in saws and tools has only slowly increased, that in builders' hardware has nearly doubled in value, Europe being the largest consumer. Nor in this list of important products should iron and steel plates be omitted. In 1894 the exports of iron plates were 4,088,000 pounds, and of steel plates 1,857,000 pounds; in 1897 the exports of iron plates reached 9,061,000 pounds, and of steel 11,365,000 pounds. Even this does not tell the whole story, for tin plate of American manufacture is being sent abroad in small quantities, the trade return for December showing 4,144 pounds thus exported. From Canada and Mexico comes the demand for plates and sheets, though England bought some millions of pounds of steel sheets.

Before leaving this class of manufactures mention should be made of agricultural implements and machinery, a highly specialized product of conditions in the United States. While the aggregate export value shows little change in four years, having increased only from \$4,766,000 in 1893 to \$5,303,000 in 1897, the distribution has been modified. In the earlier year American countries took \$1,910,000, of which \$1,203,000 went to Argentina. Hard times in that country have cut down the demand to \$348,000; but a loss of nearly a million of dollars in this direction has been made good by increased sales to Europe and Australia.

It has been countries other than England and Germany that have extended their use of these machines, notably of the mowers and reapers.

Comparison with the English exports of all kinds of machinery for the same period will strengthen the belief that the position of the United States in this class of product is now strong, while not occupying as large a foreign market as this strength would seem to warrant. In 1894 England exported £14,265,122 in machinery, and in 1897 £16,282,085. Agricultural machines showed a remarkable decrease of more than £726,000, but the loss was made good by increased exports of sewing, mining and textile machinery. Of the total exports, one-third was sent to British colonies. These figures show how wide is the territory yet to be covered, and how great are the possibilities of open competition for the American exporter.

This progress in the exports of iron and steel has been very gratifying, whether regarded as an index of industrial or of commercial power. Since 1894 the exports have increased by nearly \$30,000,000, and the imports have declined from \$34,866,800 to \$17,100,000. Of the imports, tin plates still constitute the largest single item, but less than one-half the value is now brought in that was imported in 1894. Cutlery, machinery, and certain forms of charcoal iron are another principal item of import, all of which come from Europe, where it has been seen our own products are making remarkable strides in favor. So it will be safe to say that the imports will continue to decline, more slowly, it is true, than in recent years, because only the more highly finished products are now obtained from abroad, and exports will steadily advance in importance.

## Foreign Officials on American Agricultural Machinery.

*Argentina.*—During the period of good harvests, from 1889 to 1894, 135,000 tons of fencing wire, 100,000 plows, 680,000 plowshares, 2,262 seed sowers, 27,680 reapers (including headers and binders), 2,600 threshers and 7,000 winnowing machines, exclusive of many tons of minor implements, found a ready market in this country, the farmers of this province being the principal purchasers. This demand has at present fallen off owing to the crisis, but with the prospects of a good season it will undoubtedly be renewed. I have been unable to obtain reliable statistics to enable me to show the countries from which the imports have been received, but I have reason to know that Great Britain ranks a good first, with the United States second, in the supply of agricultural machinery and implements.—*British Vice-Consul at Rosario.*

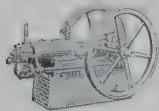
*Natal.*—Agricultural implements from the United States are special kinds of low-priced plows, well suited for breaking up virgin soil, and largely used by natives, who purchase the cheapest article obtainable.—*Colonial Governor's Report.*

*South Australia.*—Although not strictly an agricultural implement, the next item can be classed under that heading, viz., small plows for orchards, orangeries, etc., those of the "Planet Junior" type, for instance. This is an implement in large demand, which is claimed to be cheap (from 10s. 6d. each upward), light, very strong and a most satisfactory worker. It does not appear to be made in England. Some of these goods are probably covered by patent, but the English maker does not appear to produce anything that can challenge them. They are largely composed of tough wood, which in America is plentiful and cheap, and this may account for the supply and the low price.—*Colonial Governor's Report.*

*Cape of Good Hope.*—American agricultural machinery has become very popular in South Africa. The five years ended 1894 show a very large increase. American harvesters and reapers are coming into very general use, and British manufacturers will have to exert themselves to counteract this. Until lately the best plows were of British manufacture, though as regards numbers, more of the cheap American plows were imported into this colony, especially into the eastern province; but of late years the Americans have introduced their best plows, and these, both with regard to workmanship and efficiency, equal and in some cases excel the British. A few German plows are imported; these are of cheap make, and there is but little demand for them; they are suitable only for loose soils.—*Colonial Governor's Report.*

**American Fire Engines at Manila.**—Under date of February 10, 1898, Consul Williams writes from Manila: "On Sunday, February 6th, there occurred here the most devastating fire in many years. The total loss was \$1,250,000 gold, covered by an insurance of only \$375,000. The greatest consternation prevailed during the fire, as it was in the heart of the city. Vast crowds thronged the streets and stacks of goods were piled in streets and plazas. It gives me great pleasure to state that, by universal consent, the city would have been lost had it not been for the splendid service of the Ahrens fire engine, made at Seneca Falls, N. Y. It is conceded also that with four more such engines, the protection would have been perfect and the loss avoided. I shall use my best efforts to induce the city to equip its fire departments wholly from the United States, as the Ahrens engine did more work than the three European machines together."

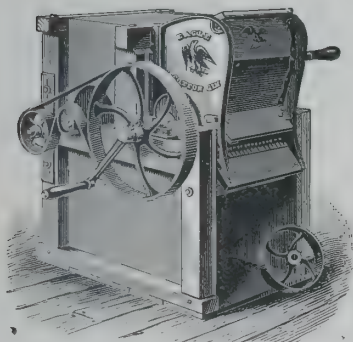


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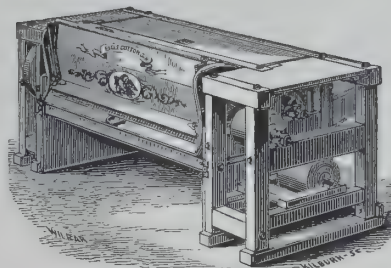
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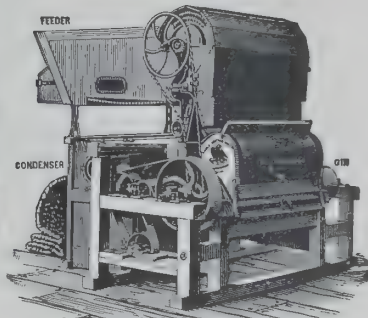
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For further details, illustrated Catalogues will be furnished on application.



Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser.

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**COFFEE MACHINERY.****The Monitor Coffee Separator and Grader**

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These Machines are in successful operation in many of the largest Coffee Houses in this country, and are well worthy of investigation by Handlers of Coffees.

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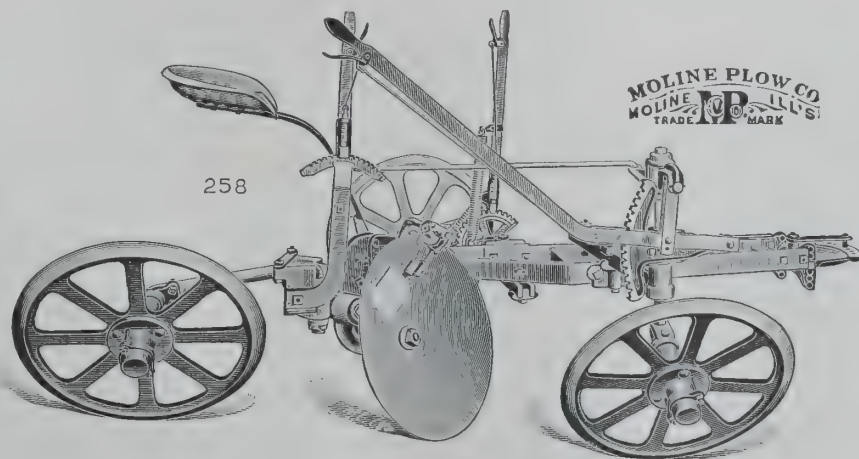
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**THE DISC PLOW.**

Made by THE MOLINE PLOW CO., Moline, Illinois, U. S. A.

IT has been a long time since any radical change has been made in the ordinary moldboard plow which in general has proved satisfactory for all classes of work with one exception.

In some parts of Texas, and perhaps in many other places, there is a black, waxy land that would resist the action of a moldboard and could not be turned with such plows; consequently these fields were left unproductive. The ambitious American could not stand this but set to work in a new line and found that the disc was the means out of the difficulty. Experiments were made, disc plows constructed and a great deal of time and money spent in manufacturing disc plows of all kinds, until to-day they find their ideal in the Rotary Dutchman, which is the latest development in this line. We show herewith an illustration, which, with a short description, will perhaps give a fair idea of its workings.



The ground is cut with the disc and turned with the combined action of the disc and scraper. Two of the wheels run in the furrows and serve to keep the plow in place, the front wheel being so constructed that the operator can guide the plow therewith. The combined influences of a

properly set disc, a well-balanced frame and a correct hitch cause the plow to run steadily and remain to its work without the use of a subsoiler, as may be found on some of the former disc plows and which makes them of tremendous draft by literally anchoring them into the ground. The Rotary Dutchman plows are made with

one, two or three discs, and the width and depth of cut can be changed at the pleasure of the operator. Two very strong points in favor of this disc plow are these:—The lower soil is left loose and the ground is so well pulverized that harrowing often becomes unnecessary.

Anyone who may be further interested can receive circulars and other information by addressing

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### An American Company in the Argentine Republic.

THE works of a large electric-power plant have just been completed at Cordoba in Argentina, the largest in the country. In 1895 the government of the province of Cordoba granted a concession to a firm to utilize the waters of the Rio Primero, which run from the highlands to the city of Cordoba, at a point where it had been found that by cutting a tunnel through a hill for some 100 metres the river could be reached again at a lower level of 30 metres, the stream having meandered around the hills for a distance of over 4 kilometres between the higher and lower points. The company to undertake the work was organized in the United States under the presidency of Theodore N. Vail, and American engineers and resident agents were appointed. In 1896 a contract was entered into with the city of Cordoba for lighting it with electricity, with power received from the river, and the works, which have just been finished, were begun at Casa Bamba, a point about fifteen miles from Cordoba.

These works comprised the cutting of a tunnel through the hill, the construction of a dam in the bed of the river at the upper or eastern end, and the erection of administration and power houses at the lower end.

The following machinery has been installed: Five turbines, aggregating 1,700 horse-power; five generators, aggregating 1,100 kilowatts; transformers with a capacity of 930 kilowatts, and the necessary switchboard and controlling apparatus.

A cable line for the transmission of power has also been laid to Cordoba. The works will eventually be enlarged up to 6,000 horse-power, and it is said that if the demand should increase sufficiently, machinery will be installed at other points along the river so as to bring the installation up to 20,000 horse-power capacity. The *Review of the River Plate* says: "We think we are right in saying that the Cordoba Light and Power Company is the first purely North American Company started in Argentina, and this fact makes us hope for its success, since nothing would assist the development of this country more than the addition of American pluck and energy to the perseverance and tenacity of British enterprise."

### Power Plant for Belgium.

THE Societe Anonyme des Railways Economiques de Liege, Seraing et Extensions, and the Compaigne Generale des Railways à Voie Etroite, of Belgium, have just ordered a complete electrical equipment from one of the largest American manufacturers for a storage battery system traction road in Ostend, Belgium, which promises to prove remarkably successful. The new line will be the first electric railway in the famous watering place, where the King of the Belgians has a magnificent summer palace.

The generating plant will consist of a 60 horse power compound high pressure engine, connected with a multipolar dynamo of 38 kilowatt capacity, making 600 revolutions a minute and producing a current of 280 volts. The cars are to be equipped with a group of batteries that will be charged at the generating station, and the car will be able to make a run of forty miles before recharging is necessary. The cars will have a speed of from ten to twelve miles an hour in the rural districts. It will require about two hours to recharge the batteries.

It is expected the system will be generally adopted throughout the European country in the use of electricity on street lines, as poles and overhead wires are unpopular and are considered extremely wasteful of electricity.

### A Use for Electric Light Carbon Ends.

AT last a use has been found for the unburnt ends of carbon taken from electric arc lamps. Mr. Johnston, the foreman of the smiths' and wood-working shops of the Baldwin Locomotive Works in Philadelphia, has recently instructed the man who changes these carbons in the lamps throughout the works to save the partly consumed pieces and bring them to him daily. He gets in this way some sixty or seventy carbon stumps, which he utilizes for making a small charcoal fire of great heat and purity, suitable for any kind of special small work not interfered with by the copper coating on the outside of the carbons. Mr. Johnston having shown the way, others engaged in kindred lines of work ought to follow his example. It stands to reason that carbon prepared with so much pains to keep it pure and homogenous must be serviceable for some of the many uses for which charcoal is required. The copper coating might be an objection for some things, but if the collection of stumps were large enough, it might pay to remove the copper with nitric or sulphuric acid, thus getting an absolutely pure nitrate or sulphate of copper, for either of which there is always a practically unlimited demand in the arts.—*Cassier's Magazine*.

### An Automatic Glass-Blowing Machine.

MANY unsuccessful attempts have been made to introduce automatic glass blowing machinery for the manufacture of blown-glass goods, such as glass bottles, says the *Philadelphia Record*, tumblers, lamp chimneys, etc., and the recent perfection of a machine for this purpose by a Toledo firm will probably have a far reaching effect on the glass trade.

The construction of the machine is exceedingly ingenious, and is operated by an electric motor on a line of shafting. Each arm of the machine, of which there are five, will produce two tumblers or other articles a minute, and 2,000 are blown in a turn of five hours. The mold opens and closes automatically, so that the actual handwork is limited entirely to decorating and ornamenting the glassware. It is stated that foreign glass manufacturers have been driven out of certain markets in this country by the cheapening of the cost of manufacture resulting from the use of this machine.

### Britain's Foreign Ore Supplies.

ONE of the most striking characteristics of the British iron industry is its continued dependence on foreign ore supplies. The Board of Trade returns for the year 1897 show that the total imports of iron ore into Great Britain during that period amounted to the unprecedented quantity of 5,968,680 tons, which would represent nearly 3,000,000 tons of pig iron, or the annual produce of about a hundred blast furnaces. To convey this large volume of ores to our shores would call for about 2,000 steamers, carrying an average of 3,000 tons each, or an average of about six steamers going and coming every day of the year, including Sundays. More than 5,000,000 tons, or over five-sixths of the total ore imports, were received from Spain, and mainly, of course, from the region of Bilbao. Arrangements are being made by several syndicates to secure a large increase of the iron ore output of Spain, mainly in the province of Asturias, whose mineral wealth is known to be very considerable.—*Iron and Coal Trades Review, London*.

### An English Paper on American Machine Tools.

A SUGGESTIVE article appears in the *Mechanical Engineer*, an English journal, concerning American competition in the machinery business. It is certain that English manufacturers are thoroughly aroused at our recent advances in this line of industry. We have had abundant evidence on this point and further testimony is only confirmatory. The *Mechanical Engineer* says that the past twenty years have afforded a "a suggestive spectacle to English people," and it adds that "at the commencement of that period nobody could seriously dispute with us the exclusive possession of almost every market to which we had access," this being particularly true with "respect to engineering work." At the present time, however, the same authority adds, the case is very different, American and German competition growing up "as it were under our eyes." Some instances are cited—for example, machine tools. In this line of goods the English paper says, "many of the latest, and we fear some of the best as regards light work, come from America, and what is more important still, they are cheaper than ours." The writer continues:

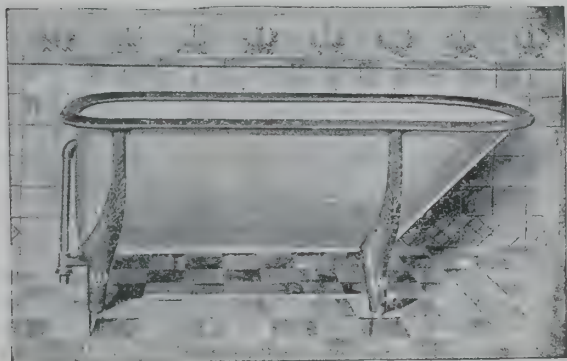
"If a particularly ingenious contrivance is seen in a workshop, one thinks instinctively of America as the source of origin, and very often the facts support the inference. If anything in the nature of explanation is attempted, it is to the effect that the quantity made enables them to be turned out so cheaply and well. Take, again, the case of typewriters, which, with one or two insignificant exceptions, are almost exclusively made in America. To turn to larger work, we have the hundred and one appliances in connection with plants for electric traction and lighting."

The English journal disclaims being an alarmist, and declares that when the trade gets free of labor-union restrictions with which it has been greatly harassed in the past, English manufacturers should put "more enterprise and energy into their business." "Neither a firm nor a nation," it pointedly remarks, "can live on its reputation forever, and there is little doubt that some of our manufacturers have been trading on theirs for a considerable time." Americans succeed, we are told, because "they keep their eyes wide open." We are informed, too, that being less conservative than his competitor in England, the American will adopt new ideas, and, in a word, "keeps his wits at work" all the time.

**This Man Objects to American Machinery.**—A writer in one of our English exchanges says American wood working machinery is too clever. He doesn't like, when trying to get a three inch plank, to find that the machine has turned out a beautiful armchair, because he had pressed the wrong button.



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Steel Enameled Bath Tub  
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Light and Strong.

STEEL ENCASED.  
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is made of Galvanized Steel to insure against rusting. Nickel-plated Waste and Overflow. Enameled outside in light blue; inside is finished in five coats of Japan Enamels, baked on, producing a beautiful white, porcelain-like finish.

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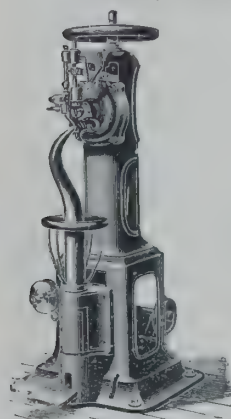
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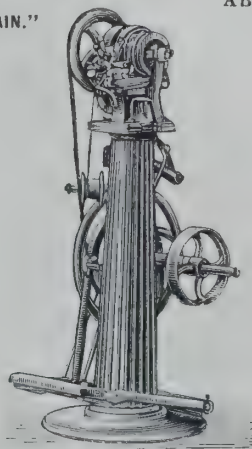
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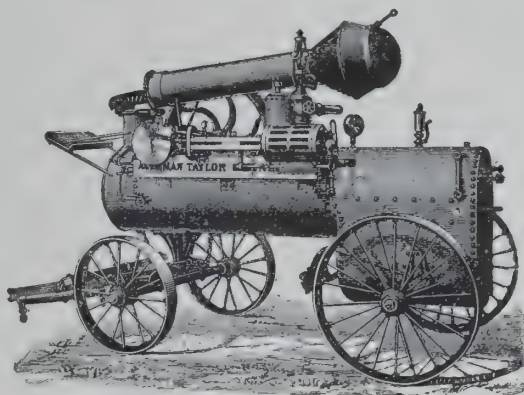
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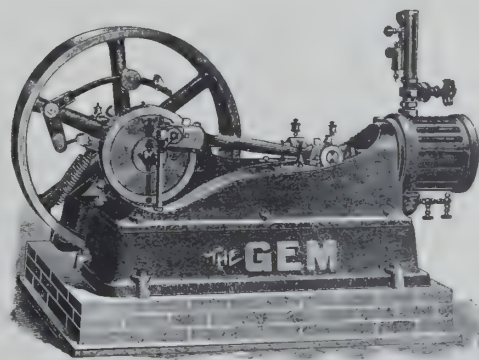


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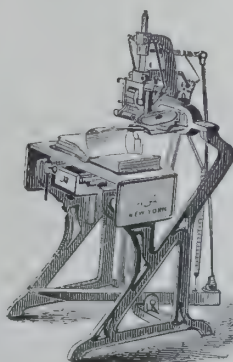
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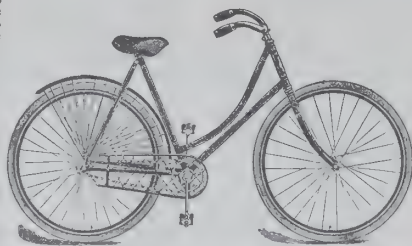
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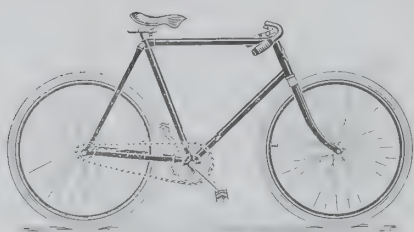
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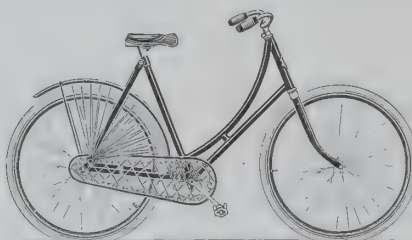
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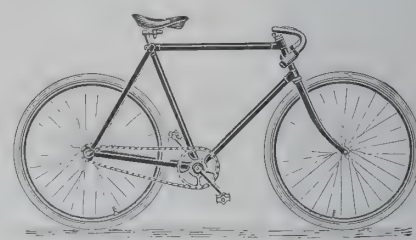
**ARENA MODEL M.** Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 34. Price, \$50.00.

Model 34 is practically the same as Model 33, excepting that it is built with drop frame, 20½ or 22½ inches, for ladies' use. Weight, about 24½ lbs.

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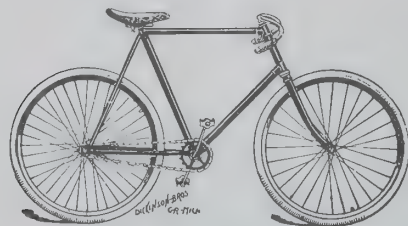


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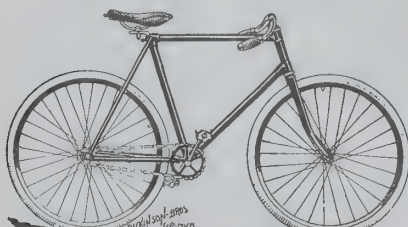
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### The American Bicycle in Europe.

THE growth of the bicycle here and in Europe has been toward the same goal, but along lines totally dissimilar. In both parts of the world the endeavor has been to produce a machine of the greatest strength, rigidity, durability and efficiency, with the least possible weight of material. Of late years there has been no radical or wide departure change in the design, if we omit the chainless type, the differences being found principally in modifications and details. These distinctive characteristics appear in evidence only upon close examination, and while they are wonderfully apparent to the expert, and serve to distinguish one wheel from its neighbor, they may be easily overlooked by the novice. The American bicycle has made a deep and permanent inroad into Europe, particularly in the markets of England, France and Germany, and is selling largely and easily in direct competition with the home product. This superiority is due in the main to the elegant appearance, high finish, and to qualities conducive to durability and easy riding. All of these results are due primarily to the methods of manufacture here pursued, and which differ radically from those in vogue abroad. There the endeavor has been to adapt, without serious change, existing tools to the requirements of bicycle manufacture; here the bicycle is built with tools designed for that particular work and intended to do nothing else. The consequence is that we here have special machines adapted to finish each and every part of the bicycle, and to produce work with the greatest rapidity and accuracy. The tool builders early appreciated the probable growth of the bicycle industry, and devoted themselves to the production of the essential tools required. The American policy of making a special tool for doing special work was in this instance followed rigorously. The bicycle designer had but to explain his needs to have them met.

This method is an old one and has been followed successfully before. Special tools appeared for the small firearm, the sewing machine, typewriter, and, in fact, for every device or appliance the magnitude of the manufacture of which required them. The experience thus gained along similar lines was placed at the service of the bicycle builder. It is no exaggeration to say that in this respect the American tool builders are far in advance of their European contemporaries. European bicycle manufacturers are grasping the advantages thus presented, and are adopting, as far as they can, American methods and tools. Unfortunately, they cannot purchase with the tools the ingenuity which brought them into being nor the skill which may successfully alter them. The high excellence of the American bicycle is therefore due in a great degree to the tool designer, who has been so quick to supply the demands made upon him and whose entire training permitted the perfect solution of the problem.—*Iron Age*.

### Wood Rims.

ONE has to remember the experience riders used to have with rims to appreciate the efficiency and satisfactory character of the wood rims now in use. When it is borne in mind that there is no longer a "rim question," properly so called, and that the average rider seldom gives a thought to his rims, the change can be better understood. Quite a different state of affairs prevailed when steel rims were supreme.

In those days the heavier spokes and wider hubs used in wheel making should have imparted the greatest possible stability to the wheels. Yet it is well known that buckling was a common occurrence, and that few riders regarded themselves as safe from such an accident. When it did happen the wheel could sometimes be sprung back into shape—sufficient at least to enable them to get home; but more frequently there would be such a "wobble" that the wheel would not go through the forks, and a walk or the taking of a train was the only alternative.

In addition to this, the steel rims—both hollow and solid—had a very disagreeable habit of cracking—usually in cross section. In such cases a piece of metal could be brazed in, but the spokes had to be taken out to do it, and it was an expensive job. Then when obstacles were struck—stones or curbs, or

anything of that kind—the result was apt to be the denting of the rim. This failed to improve either its appearance or its utility.

When wood rims were first introduced, and for several years after, they gave plenty of trouble. Each season, however, witnessed an improvement, until it is not now easy to point out how further steps in this direction could be taken. There are all kinds of wood rims being made—most of them good, but a few bad, because cheap. As far as the good ones are concerned, there is very little well grounded complaint on the part of either riders or retailers.

About the only disadvantage of the wood rim is that in case of a collision or serious accident it is very likely to be demolished. This is inconvenient, to be sure, but the result is no worse than would have happened in the case of a steel rim. On the other hand, the wood rim will stand shocks that would wreck its steel rival. In the matters of weight, life and cheapness, the wood rim leads by long odds.

There are still differences of opinion among rim makers as to the proper way of making them. Many pin their faith to one-piece rims; others consider that better results are obtained from laminated rims. Each possesses advantages, but the rim making industry has undergone such a change for the better that it is not easy to pick flaws in either style.

It must be said, however, that a laminated, or built-up, rim is stiffer and will retain its shape better than a one-piece one. In fact, observations show that by their use the necessity for frequent truing of the wheels is almost done away with. It is by no means rare to have machines fitted with them go through an entire season without having to be touched with a nipple wrench. The stiffness of the rim, and its non liability to warp, also appear to lessen spoke breakages. The only drawback to the use of such rims is their occasional liability to come unglued. The percentages of such cases is not nearly so large as formerly, but it seems to be an impossibility to make a glue that will not occasionally dry out or lose its life.

Of course, the one-piece rim is free from this defect. The joints, as now made on nearly all makes of rims, are almost certain to hold together as long as the rim is used, and there is no reason for anxiety on that score. So, too, the reliability of these rims has reached a stage where only the most critical can find any fault with them. If the machine is ridden much and hard the wheels will occasionally require a little truing. But no one could complain of this, so slight is the trouble, unless absolute perfection were demanded.

So it has come about that the rim question has been eliminated. Old riders have forgotten the troubles they formerly had with rims and new ones are entirely ignorant of them. It but shows that the confidence felt in the ability of rim-makers to reach a point little short of perfection was not misplaced.

### Concerning Lubricating Oil.

A RECENT treatise on lubrication says that indisputable authority has demonstrated that friction is the resistance of the microscopic irregularities of surface to removal, and the heat engendered represents the work done in overcoming this resistance. To prevent this waste of energy and the wear of material which it represents, to say nothing of delays and annoyance, science and common sense have united in discovering and perfecting a number of substances which, when introduced between two rubbing surfaces, fill the microscopic irregularities, and so lessen the amount of friction if they do not fully overcome it. An oil lubricant, by filling up the inequalities of the bearing surfaces with its globules, lifts the opposing surfaces above the irregularities and forms a new surface, consisting practically of an innumerable series of microscopic but perfect "ball bearings," and through their intervention the friction of solid bodies is exchanged for a fluid friction. For heavy pressures, there fore, a highly viscous oil, and for light pressures a more fluid lubricant, should be adopted; consequently, for heavy machinery, oil should be selected different from that used for light machines, and for work at low temperatures an oil different from that adapted to high temperatures. For each use an oil definitely adapted to the immediate purpose in view should be selected. It is said that a well-known American watch company makes use of nineteen different kinds of oils, so varied is its machinery.

**A Good Showing for American Wheels.**—A French consul in Asia Minor reports to his government that cycling has been in vogue five or six years, but it is only within the last three years that it has shown signs of development. Smyrna now owns more than five hundred bicycles of all grades of price and brand—a number which is increasing from day to day. Cycles at first came principally from England, but recently America has commenced to compete, and the percentage of trade is now as follows: America, 50 per cent; England, 25 per cent., and 25 per cent. for Belgium, Germany and France.



### Putting on a Finish.

TO most people the enamelling of a bicycle appears a simple matter. If they have ever given the subject thought they regard it as of but little importance, and one which need be given scant attention. To put on a little black paint—or other colors as may be desired—surely that is easy enough!

They are right—in a measure. It is easy enough after everything has been got to run smoothly, and the work comes out of the enamelling-room without a blemish—and provided none developed themselves within the next few months. But to reach this point of perfection, and to retain it, requires the expenditure of much time and money. In not a few cases the lack of these essentials has been a considerable factor in causing the failure of concerns with fair prospects.

The prime requisites for turning out good work in this department are skillful enamellers and proper appliances for them to work with. The latter include a room, or rooms, as nearly dust-tight as possible, good ovens and first class enamel. So well understood is this that manufacturers seldom fail to give their head enameller carte blanche in the matter—providing, of course, that his demands do not exceed the bounds of reason.

After a frame or pair of front forks have been brazed and filed they are given to what is termed a "finisher," who goes over them carefully to see if they are ready for the enamer. It is his duty to see that the tubes and joints are all perfectly smooth, and if they are not to make them so. The most minute indentation, file marks or even the marks left on the tubing as they come from the draw benches must be removed. They would show through the enamel, and very plainly, even although they may have been hardly perceptible before, and the uninitiated would imagine that the enamel would cover them up.

When the enameller takes up a frame he should be able to tell how it will come out—whether there will be any blemishes on it when it comes from the oven. If any are apparent he himself doctors them, and if they are serious he returns them to the finisher. He should and must be the judge; defects that develop later should have been noticed by him and removed before the first coat of enamel was applied.

The parts being ready for their first coat, the enameller begins. The next step depends upon the kind of work that is to be done. This may be roughly divided into three classes: Brush work, where the finest finish is desired; dipping, as practiced in many factories that do good work; and dipping, as practiced where the sole object seems to be to cover the metal with some kind of a finish.

In brush work three or four coats are usually applied, and the process bears considerable resemblance to carriage finish. The enamel is applied with a brush, baked and rubbed down thoroughly with a fine emery or pumice stone. The last coat is, of course, the most important, both in rubbing down the previous coat and in applying the final one. When the part comes from the oven for the last time the skill of the enameller comes into play. He gives the final rub down, and if it passes his inspection it goes to the frame-room.

The dipping process consists of simply putting corks in the various openings of the tubes, and then dipping the parts into a tank full of enamel. When it is desired to obtain a fine finish, almost as much care is devoted to the work as when the enamel is brushed on. Great precautions must be taken to see that the enamel is kept at the proper consistency. If it is allowed to get too thick it will clot and streak and otherwise interfere with the good results. If it gets too thin it will not flow evenly, and will leave places where there is little or no enamel. Hydrometers are used to test the consistency of the enamel, and see that it is kept "just right."

As a rule, good enamellers are regarded as cranks. It is absolutely necessary for them to insist on having every detail to their liking. The enamelling-room must be as near dust proof as possible. Double floors and ceilings are frequently used to attain this purpose, but all these precautions may be nullified by the careless opening of a door that will let in a cloud of dust. The combined effect of a tight and heated room and a hot summer day is not calculated to improve the temper of the average man.

Frequently work is ruined by faulty ovens. If dust gets in, or the gas is not properly carried off by the ventilators, or the heat is not steady and under complete control, everything else goes for nothing. Sometimes ovens heat too quickly and are difficult to keep from getting so hot that they will burn the work. Again, they are just the reverse, and enough heat cannot be obtained, or it is not steady enough; if the enameller take his eyes off the thermometer for five minutes he may find his work ruined.

Take it all in all, the life of an enameller is not always a happy one—certainly not until the season is well advanced and everything is working smoothly. Even poor work will pass muster if examined only casually. But most makers

are not satisfied with such a standard, and look to their enameller to give them good work.

The most difficult thing for him to obtain is a smooth finish, and that is the real test of his work. Minute particles of dust, as well as gas from the ovens, will settle on the parts, and be perceptible to the touch, although the eye may not be able to see them. When an enameller succeeds in overcoming this to a reasonable degree he feels satisfied.—*The Wheel*.

### Making Aluminum.

PROF. ELISHA GRAY, in the *Times-Herald*, tells how aluminum is made at Niagara Falls. It is now made about as cheap as brass, bulk for bulk, but not pound for pound, for aluminum is very light, its specific gravity being only about one-third that of iron. Native aluminum is found in clay and in a state of silicate, as in felspar. It is found in great quantities in southern Georgia, mixed with red oxide of iron. It is the alumina there which is the oxide of aluminum. When separated from other substances it is a white powder. Electricity is the chief factor in the production of metallic aluminum. The powdered aluminum is placed in vats lined with carbon. Then the description of the process is as follows:

Immediately over the vat is constructed a metal framework, through which are inserted a large number of carbon rods about 18 or 20 inches long and from 2 to 2½ inches in diameter. This framework is insulated electrically from the iron crucibles. The framework and the carbons are connected with the positive conductor of the electric current, and the vat or crucible with the negative. These conductors are very large, something like a foot in width and an inch in thickness, and made of some good conductor of electricity. They have to be very large because they carry a current equal to 3,050 horse-power. The current is one of great volume, but very low voltage, the electro-motive force at each vat or crucible being only about seven volts. As the process is electrolytic, and not simply a heating current, the direct process must be used, and therefore must be transformed twice—first to bring it to a proper voltage and secondly to change it from an alternative to a direct current. These iron vats or crucibles are connected up in series, electrically, and then they are filled with the alumina and certain other materials, which act either as a flux or as a means of increasing the conductivity of the mixture; just what this substance is is probably one of the secrets of the process. When all the crucibles are filled with the mixture the current is turned on and is kept on continuously night and day seven days in the week. All of the material in the different crucibles is heated to redness when the process of separation takes place. The oxygen of the alumina is thrown off as a gas, and other residuum floats to the top of the crucible and is skimmed off.

Metallic aluminum in a melted state sinks to the bottom of the crucible, where it is dipped out from time to time with large iron ladles and poured into sand and molded into blocks similar to that of pig iron.

Aluminum is most useful as an alloy with other metals; it is being extensively used in many directions, and would be vastly more used except that up to date no satisfactory way has been discovered to solder it. In different compounds it is estimated that aluminum forms about one-twelfth of the crust of the earth.

### Future of Nickel Steel.

THE growing demand for nickel steel is receiving considerable attention in the United States and Canada. There are said to be but two nickel deposits in the world of commercial value, one in New Caledonia, belonging to France, the other at Sudbury in British territory.

Since the discovery that nickel in a small proportion added to steel makes a combination—nickel steel—of extraordinary tensile strength and capable of resisting a blow that would smash the same amount of ordinary steel into fragments, naval constructors in all countries have begun to sheath their vessels in nickel steel armor, and latterly ordinary plates for shipbuilding have been discarded in many places for nickel steel. The high price of nickel heretofore has prevented the use of nickel-steel in large quantities for commercial shipbuilding, but with a reduction of price to reasonable figures it is the opinion of experts that nickel-steel will be the metal not only for the warships but for the mercantile marine and the bridge-building of the future. The most important use of nickel for the moment, however, is in the protection of warships, and the immense navies now being created by the great powers will be sheathed in nickel-steel. The production of nickel must be increased enormously in the near future to meet this demand.





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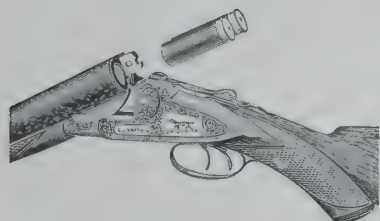
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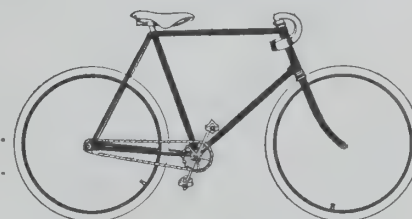
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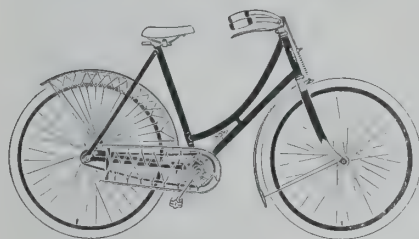
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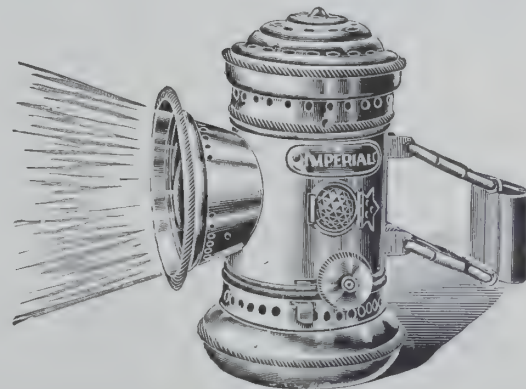
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THE advantages of electric power in the operation of machine tools is well illustrated in an up-to-date bicycle factory in Ohio. This factory is about a mile distant from an electric light and power station from which the electricity is brought over wires strung on poles in the ordinary way. It reaches the factory at 1,000 volts and passes into six 40-horse-power, one 20 horse power and two 10-horse-power transformers, which reduce the pressure to 115 volts. The large transformers furnish the current for the motors; from the three smaller the lighting circuits are run.

The largest room in the factory is the machine and tool room. This contains three lines of 8 inch shafting each 210 feet long and each connected to a 20 horse-power motor. From the shafting, belts are dropped to the different machines, lathes, drills, shapers, milling machines, emery wheels, planers, grinders, gear cutters, punch presses, hub machines and screw machines. In all 84 machines. In addition to these an oil separator, two oil pumps and a high pressure blower for the forges in the blacksmith's shop are also driven by the motors. By means of friction clutch pulleys the three lines of shafting may all be connected together.

The 26 machines in the drill room, drills, grinders and milling machines, as well as a band saw, a circular saw and a lathe in the pattern room, are driven by a 10 horse-power motor. Another 10 horse-power motor operates all the machinery in the frame department.

The double polishing frames in the polishing room require two 30 horse-power motors. These are boxed in and are belted to two lines of 2½-inch shafting each 98 feet long. Another 30 horse-power motor in this room drives a large suction fan which takes up the dust from the polishers. In the plating room two plating dynamos are driven by a 5-horse-power motor and another of 5-horse-power in the assembly room drives 110 feet of 2-inch shafting for a number of small machines and operates in addition a three-ton elevator.

The electric system employed is the monocyclic system, an alternating current system, introduced by the General Electric Company, by which motors and lamps may be run from the same circuits, change of load on the motor circuits not interfering with the light of the lamps. The motors are induction motors, with no commutator, brushes, collector rings or moving contacts. Three small wires fastened to three binding posts bring the current to the motors, which run at a constant speed. They demand no attention beyond an occasional oiling and are for the greater part of the time called upon for much more power than that for which they are rated. As there is no jar on the floors, all the machinery runs without vibration, and the manufacturers assert that to the absence of vibration and the constant speed of the motors the satisfactory operation of their plant and the finish of their product is almost entirely due. Among the advantages resulting from the use of electric power in this instance may be mentioned the dispensing of both the initial and running cost of a power plant and the utilization of the space that such a plant would occupy for other purposes. In addition, each separate machine may be driven by its own motor or one motor may drive a section of shafting of any length; there are no idle pulleys or shafting to keep in motion and each machine thrown off diminishes the load on the motor and consequently the demand on the source of power; in other words, the consumption of power is proportional to the load. The speed of machinery driven by motors is constant and reliable and there is no vibration. This allows of a more finished product, as well as an increased output without increase in the plant. Furthermore, the motor demands no floor space. It may be hung inverted from the ceiling, be slung from it on a platform, be placed on a shelf or attached to the wall.

### Big Fortunes from Little Inventions.

IT has become almost an axiom with the majority that larger fortunes are to be raised from some simple invention than from difficult and expensive inventions that involve a great outlay of money to manufacture. This is, to a certain extent, true. A certain American patent for fastening kid gloves has yielded a fortune of several hundred thousand dollars for its fortunate owner, and the inventor of a collar clasp enjoys \$20,000 a year royalty as the reward for his endeavor. A new kind of sleeve button has made \$50,000 in five years for its patentee, and the simple twisting of safety pins in such a way that there is no possible danger of the point sticking in the child promises to enrich its owner beyond any of his early dreams of wealth. A man one day turned a piece of wire so as to hold a cork more securely in a bottle, and forthwith somebody saw a brilliant idea and patented the modern wire stopper holder, which is now used annually on several million bottles. The accidental bending of a hairpin by a

woman to prevent it from sliding out of her hair so easily produced a fortune for her husband, who immediately saw the possibilities of a crinkled hairpin for women.

Instances could be multiplied indefinitely of large fortunes being made from small inventions; but fortunately for those inventors who make a life study of intricate problems of mechanics, and disdain to waste their talents upon trivial, popular articles of the day, there is often also ample reward in store for the products that take years to produce, and which revolutionize existing methods of industry and mechanics. Edison has reaped honors and riches of a princely character from his discoveries; McCormick has realized in his reaper the fortunes of a millionaire; the Corliss engine brought honors and decorations to its inventor and enabled him to amass a great fortune in a few years; Professor Bell found in his telephone not only the consummation of his early hopes and ambitions, but a substantial pecuniary reward; Harveyized steel armor has become synonymous with the inventor's name, and it brings an annual income of huge proportions to its discoverer; Elias Howe, the inventor of the sewing machine, realized over \$2,000,000 from his inventions; and Nikola Tesla, though still young and rich in promises, finds abundance of money in his work. —*Cassier's Magazine.*

### Sewing Machine the Agent of His Promotion.

THE Marquis de Fontenoy, the clever newspaper correspondent who tells us all about the nobility of the Old World, writes: General Baron von Thoemmel, who has just retired from the post of Austrian Envoy at Belgrade, with the rank of field marshal, is indebted for his diplomatic success as well as for his remarkably rapid military promotion, to a sewing machine. In 1848 he took part in the Hungarian revolution against Austria, but a few years later entered the Austrian army as a private. Having worked his way up from the ranks he was appointed military attaché to the legation at Cetinje.

The court of the reigning Prince of Montenegro, which is even now of a rough and ready nature, was then still more primitive. The Princess had never heard of such a thing as a sewing machine, and on being informed of the invention by the Captain, as he then was, she expressed a great desire to possess one. The gallant officer took note of her wish and at the first opportunity he not only purchased a superb machine at Trieste, but even took the trouble to learn to sew with it, so as to be personally able to instruct the consort of the sovereign to whose court he was accredited.

Day after day the Baron was to be seen in the princely konak, or palace, at Cetinje, engaged in teaching the beautiful Princess Milena how to work the sewing machine. And even after her highness had become proficient, she used to summon the officer from the Austrian Legation whenever a needle broke or the machine got out of order. As long as Theommel remained at the Montenegrin capital, Austria's influence, thanks to the sewing machine, was paramount and predominant in the land, and of such value was this to the Imperial Government at Vienna that the officer was promoted to the rank of envoy, as well as to that of colonel, and on being transferred to Teheran, was created a baron. Whether the machine to which the Baron owed his well-deserved success was of American make history does not record, but as that invention was first brought out in this country it would seem to be more than likely. —*Sewing Machine Times.*

### Southern Iron in England.

THE English trade papers do not seem to tire in discussing the appearance of Alabama iron in their markets. The London *Economist* discusses the subject in an elaborate article, in the course of which it says:

"It will surprise many to learn that coal is much cheaper in America than in England. The average price in the United States ranges from 3s. to 4s. at the pit's mouth, while in this country the average is between 6s. and 8s. Cheap coal leads to cheap pig iron, and it is stated that pig iron can be produced in Alabama at about 25s. per ton. The carriage to the shipping ports of Pennsylvania and Mobile (a distance of about 270 miles) is only 4s. per ton, or about one half the rates which would be charged in this country. Although pig iron is exceptionally cheap in the Southern States, still, as similar conditions exist in the Pittsburg districts, we can understand how the Carnegie company is able to compete with the makers of English rails at a time when, by a combination, the price has advanced from £3 15s. to £4 10s. per ton. Although considerable quantities of steel bars and billets, wire and other kinds of manufactured steel have been imported, it would appear as if pig iron and steel rails were the departments in which the American makers were likely to have the greatest amount of success."



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WE ARE THE WORLD'S HEADQUARTERS  
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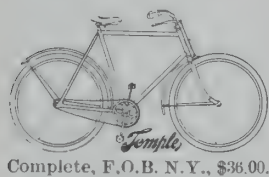
Are successful business men, consequently well-informed  
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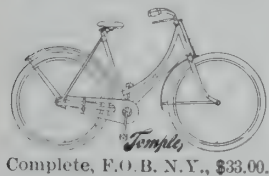
Well-made wheels give riders satisfaction and dealers  
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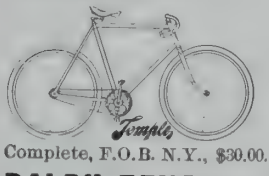
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Complete, F.O.B. N.Y., \$36.00.



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## High-Grade Bicycles.

THE BEST	{ Ladies' and Gents', }	\$36	F. O. B. New York.
2nd BEST	{ Ladies' and Gents', }	\$33	F. O. B. New York.
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We also make a good Bicycle for \$21.60, for Ladies  
or Gents, with brake and guards, F. O. B. New York.

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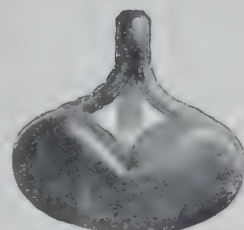


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conformation to the human body  
in the sitting posture. Recom-  
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Flat Coil Steel Spring.  
No Rebound.  
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On a good saddle depends the comfort and enjoyment of cycling.



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and make sure of your comfort.

No saddle soreness where it is used. Physician  
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BUILT TO SIT ON,  
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In ordering through export commission houses,  
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## Spring Seat Post

Solves the Problem.

No bicycle complete without it. It will prolong  
not only your own life, but life of your wheel.  
Lateral motion obviated by tightening screw. In  
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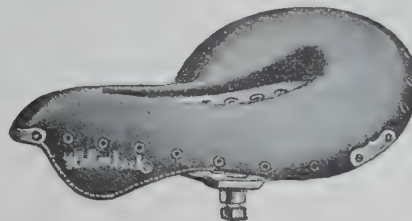
**The Berkey Adjustable Spring Seat Post Co.**

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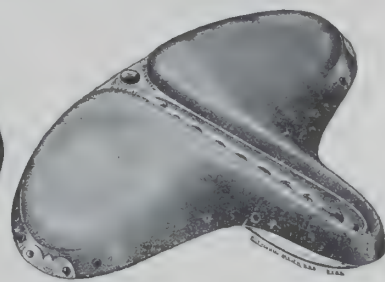
**HOLLENBECK SADDLE CO.,** Successors to F. A. Hollenbeck & Co., Syracuse, N. Y., U. S. A.

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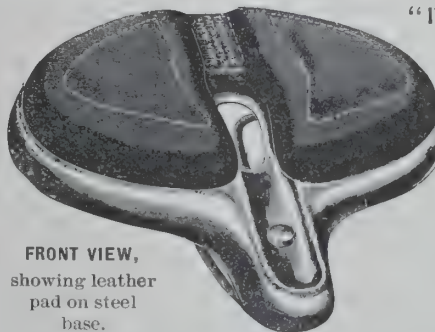
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## LENOX ANATOMICAL SADDLE.

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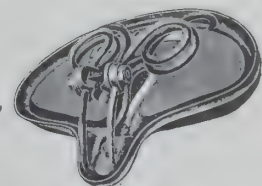


FRONT VIEW,  
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Two  
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8 1/2  
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are famous the world over for quality,  
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**SUNDRIES** manufactured by us  
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Manufacturers, Jobbers and Dealers  
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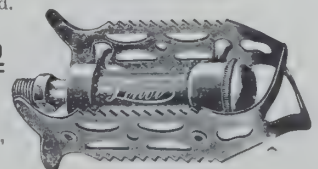
197, 199 and 201 Grand Street,  
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Lenox Automatic Bicycle Bell.



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### Bicycle Balls.

THERE is a concern in this country—and quite a large one, too—that actually has trouble in inducing manufacturers of balls to quote it prices on these small but indispensable articles. This extraordinary backwardness is due to their knowledge of the rigid system of inspection in vogue at the factory in question, a system which they consider one beyond reason. In purchasing balls, this concern insists that only “specially gauged” balls be sent them, i. e., balls that have been subjected to a special gauging (by hand), and that all failing to reach a certain standard be rejected.

When this method of selecting balls was first put into practice several years ago a firm bearing the highest possible reputation for the quality and accuracy of its goods was requested to quote prices and submit samples. As a result of the correspondence that ensued this firm ascertained just what the cycle manufacturers desired, in the way of special balls, and also the important fact that they were willing to pay the price their exacting demands rendered necessary. A contract satisfactory to the ball makers (and presumably to the other parties to it) was drawn up, and a shipment of balls made under it. A large proportion of them were returned as not being up to the standard required, and it then transpired that each ball had been gauged by the cycle maker at his factory; and, notwithstanding they were specially selected balls, sent by the ball-makers without the slightest suspicion that they would not be satisfactory, they failed to stand the second test.

A fresh lot of balls were sent, and a number of them were returned. This continued during the entire season, the ball makers being unable, in spite of their utmost endeavors, to furnish goods that were entirely satisfactory. They claimed that this very particular customer was rejecting balls that were just as good as the accepted ones, and that they were all as near perfection as human skill could make them. The cycle manufacturers, on the other hand, claimed that some of the balls were not round, and that others varied from the proper size. The inaccuracies were slight, and betrayed only by the use of micrometers, but they were there, and it was impossible to make a perfect bearing if imperfect balls were used. The next season other manufacturers of balls were appealed to, but with little better result, and at last accounts these cycle manufacturers were still seeking the impossible—the perfect ball.—*The Wheel.*

### An Australian View of American Export Trade.

THE United States, it is now admitted, is likely to prove a competitor with Great Britain in supplying the world's markets. Latest advices from Baltimore state that the ability of the American manufacturers to underbid their English competitors in markets hitherto monopolized by the latter is being daily demonstrated. For instance, the Maryland Steel Company has just secured the contract for the supply of 8,000 tons of steel rails for use on the East India railways. A large proportion of this order has already been shipped to Calcutta, and, it seems, has created something like a scare among British manufacturers. Indeed, the attention of Parliament was called to the matter late last July, and the reply given by the Secretary of State for India was that the lowest tender received from any English firm was £8,675 higher than that sent in by the successful tenderer. The Maryland Company's tender was, it seems, \$5.35 per ton below the lowest English tender. Canada is also transferring its orders to the United States for steel rails, the Intercolonial Railway having recently purchased 3,000 tons for delivery at Halifax, while 1,000 tons have been sent to Prince Edward Island. Turning to the British colonies, 1,500 tons of steel rails have been purchased for South Africa, to be delivered at Cape Town; while the Lackawanna Steel Company has booked an order on Australian account for 2,000 tons of steel rails, delivered at Sydney. This, it may be remarked, is the first large order sent to the United States by Australia for this class of goods; but as the price at which the rails can be supplied is lower than they can be obtained in England, there appears to be every prospect of those orders in the future going in the same direction. Perhaps the most interesting item in this new opening of American trade is to be found in a Cleveland company having secured the order for 20,000 tons of steel rails for the electric roads in Ireland.

Nor can it be said that it is only in tin plates and steel rails that the interests of British metal manufacturers are being threatened by the United States. The majority of vessels sailing from New York for Melbourne or Sydney, our advices state, are taking forward iron either as pig or in manufactured form, while the shipments to Europe have largely expanded. One Tennessee company alone exported 60,000 tons in iron and steel to the Continent during the earlier months of the present year. The Carnegie Steel Company has obtained an order for 18,000 tons of steel for the new Victoria Bridge at Montreal, Can-

ada; while the orders for iron and steel girders and beams are so large that the mills find considerable difficulty in meeting the demands on the working resources, and our latest advices state that in all directions plants are being increased, and a large addition is being made to the hands employed in the various industries.—*Melbourne (Australia) Age.*

### Our Exports of Paper.

THE *American Paper Trade* says: The exports of paper are increasing very rapidly and now amount to 200 tons a day. Those who are working up the foreign trade say that within three months they will be shipping 500 tons a day to Europe, Australia, Africa, South America, Mexico, India, China and Japan. The Japanese trade is interesting, and, although the “Japs” are large exporters of paper, they are now buying their cheap print paper in the United States. Orders for 5,000 tons have been received from Japan within the last few weeks, and an order of 1,000 tons came the other day by cable. Seven complete plants for the manufacture of paper are now en route to Japan, and will be set up there within the next few weeks by American experts; but, notwithstanding their cheap labor, the Japanese cannot produce print paper at any lower cost than the United States, although their fine paper surpasses ours. We have the cheapest material and the cheapest water power in the world, and some of our best equipped mills can now turn out print paper with a profit at 2 cents a pound. England is one of the most profitable markets for print paper. Two or three of the newspapers of London now receive their entire supply from the United States, and it will not be many months before other newspapers will discover the advantage.

### The Engineer in Modern Warfare.

THE present agitation in connection with the outbreak of war brings to the public mind most forcibly the remarkable extent to which engineering has entered into all the details of modern warfare. It cannot but be realized that it is to the work of the engineer more than to any other member of the community that the country must look for defense or offense, and that it is in the machine shops and shipyards, in the drafting rooms and mechanical laboratories that the destinies of modern nations are to be decided.

One has only to look back a few hundred years in history and note the absolute transformation wrought in warfare as soon as the introduction of gun-powder and fire artillery became an accomplished fact. The trained knight, bred to arms, and honestly believing that in him lay all the science of warfare that could ever be possible, was suddenly transformed into a ridiculous Don Quixote, helpless before the rude band of peasants, who, with their “villainous saltpetre,” made all his knowledge of the art of war obsolete. To-day we are on the verge of a similar transformation, and there is every reason to believe that the ingenuity of American engineers, constructors and inventors will evolve devices of destruction before which the existing battleships and fortifications will soon be relegated to obscurity. Two instances of most recent occurrence have demonstrated the weakness of modern warships: One, the case with which the single blow of a ram sent the *Victoria* to the bottom of the Mediterranean, the other, the havoc which a single explosion wrought upon the *Maine* in Havana harbor. The modern warship is fatally like the armored knight of mediæval times—vulnerable because of exceeding bulk and clumsiness, a fair mark for the skill of the engineer who can combine force and motion and substitute rapidity for massiveness and secrecy for strength.—*The Engineer.*

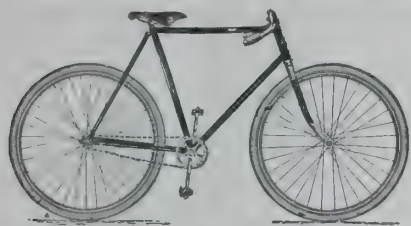
**A Monster Gun.**—In the gun factory at Watervliet Arsenal the Government is constructing the most tremendous rifle ever made. It is a 16 inch gun, and, when completed, will have cost \$390,000. It is 49 feet 2 inches long and weighs 126 tons, six tons more than the giant Krupp exhibited at the World's Fair.

This gun will be mounted on Romer Shoal, inclosed and protected by a turret. From this position it will have a full sweep of the channels entering New York harbor. With a 900-pound charge of powder it will throw a 1,000-pound shell fifteen miles. This shell will move 2,000 feet a second, with a striking energy equal to that of a 2,000-ton ship moving at full speed.

No known armor or material can withstand this fearful impact. The heaviest protection would be as cardboard, and open in huge, jagged holes, while the shell would tear and rend the very bowels of an enemy's warship.

So delicately is this greatest of the world's armament built, and so perfect is the system of sighting and firing, that the enormous shell flies straight and true to its target, miles away, as surely as a sharpshooter plants his bullets in the bull's-eye with unvarying accuracy.





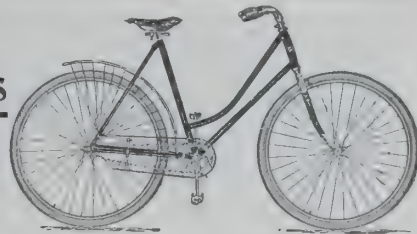
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CABLE ADDRESS: "SOUDAN, CHICAGO."

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COMPETITION KILLED  
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GREATEST LINE OF BICYCLES ON EARTH  
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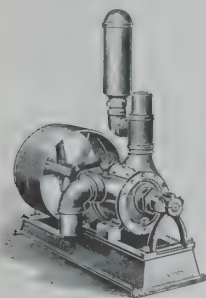
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WINDSORS, NORTHFIELDS, WINFIELDS.

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In sending orders through export commission houses send us duplicate order.

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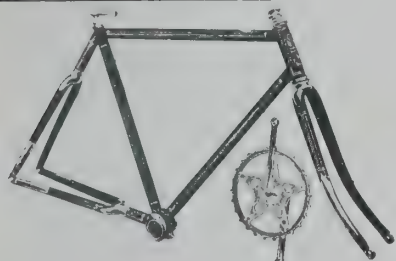
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They run at a slow motion,  
Have positive suction,  
Are very nearly noiseless and self-priming.

Valve can be removed without taking off heads or pulleys.  
Will pump more liquor at a less number of revolutions than any other pump on the market. WE GUARANTEE THEM. Send for Catalogue A. Correspondence solicited.

**CARLEY HEATER CO.,**  
OLEAN, N. Y., U. S. A.



"THE FINEST ON EARTH."

That's a broad claim to make for anything, but in the case of the

**MANSON 3 CROWN**  
MODEL 33

it's but the simple truth, and there is no need to deviate from the truth.

The Several Reasons Why?

It is made of the very best material.

It is new and novel and eminently practical.

It has two rear crowns to match the front fork crown, causing the machine to be absolutely rigid.

It has an eccentric bracket at the hanger which facilitates the adjustment of the chain without using the rear chain adjusters, and is fitted with the one-piece Fauber crank.

The Thor Hubs are used and recognized everywhere to be the best.

The best swaged spokes, 14x16 size, are used.

Laminated or one-piece selected rock-elm rims, 1 1/4 or 1 1/2, 28-inch wheels, drilled 32x36.

The Peacock or Baldwin adjustable chain.

Head set, turned from bar steel, drop forging connections.

Seamless tubing throughout.

THE PRICES—\$75 less 3 1/4% and 5 per cent., delivered f. o. b. New York

MANSON CYCLE CO., 73-75 West Jackson St., Cable Address: "Manson." Chicago, Ill., U.S.A.

Dunlap tires.

Steel adjustable handle bars.

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Finest nickeling and enameling that can be put on a bicycle.

Frames, 22 and 24 in. high.

Weight complete, 24 lbs.

Choice of gear.

Ladies' frames are made same as gents, with exceptions of drop bar and chain guards.

Height, 20 and 22 inches.

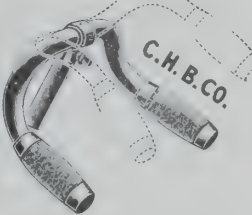
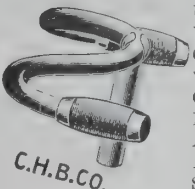
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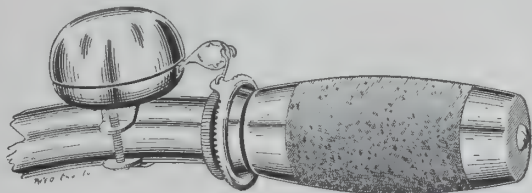
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Octagon Tube, extra, per doz.....	3.00
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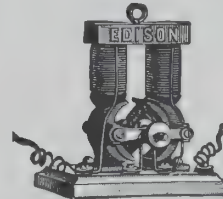
without the slightest change; is adjustable and strictly high grade, and the proper thing for bicyclists to have. In ordering goods through export commission houses send us a duplicate of order. For further particulars address

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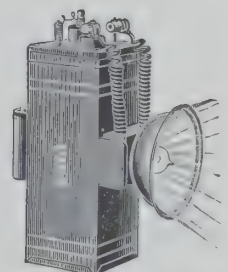
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### A SUBMARINE TORPEDO BOAT.

THE most interesting and successful of the numerous warlike inventions that have sprung into prominence in view of the actual existence of war is a novel submarine boat invented by Mr. John P. Holland, the performances of which, both in surface and submarine travel, have demonstrated, at least to a remarkable degree, the feasibility of long continued and definite travel under the surface of the ocean, or partly submerged.

This boat is 53 feet long, 10½ feet in diameter, and displaces 75 tons. The hull is cigar-shaped, and is made of ½ in. to ¾ in. steel plates riveted to steel frames. The top is flat, with two hatches and a central telescopic conning tower 2 feet in diameter and 3 feet high. Steering is done by two sets of rudders, one vertical for steering on the surface and the other horizontal for regulating the depth of submersion. There are three sources of power for propelling the boat above and below the water, expelling water, discharging torpedoes and dynamite guns, and lighting the ship internally and externally, namely, compressed air, gasoline and electricity. The most important agent is compressed air, without which it would be impossible to operate the boat under the sea. The air compressor used is a single acting compressor belt driven from a gasoline engine when the boat is on the surface, and from an electric motor switched to a storage battery when the boat is submerged. The compressor is capable of compressing air to 2,500 pounds pressure; the diameter of the low-pressure cylinder being 6 inches, and of the high-pressure cylinder 1¼ inches with 8 in. stroke. Both cylinders are immersed in a water box, which cools the air during compression. Solid disks serve for fly wheels. The space occupied is only 6 feet long and 2 feet high.

The highest value of the compressed air is for the respiration of the crew, numbering ten men. For this purpose the air is expanded through two reducing and one regulating valve, and is set free at normal atmospheric pressure. Six times the requisite volume of air is available. The surplus air is used for counteracting the deleterious effects of the ventilating pumps, which would produce a near approach to a vacuum if the air supply to the tanks were interrupted in its even flow.

The steering and diving gear are operated by compressed air, which also maintains an air pressure throughout the boat equal to the hydrostatic head when the boat is submerged. The boat is submerged quickly by admitting sea water to a series of steel tanks connected with the compressed air system. When the signal is received to elevate the boat air is forced into the water tanks under high pressure, and as the water is expelled the boat rises to the surface. The air tanks have been tested to stand a pressure of 3,000 pounds to the square inch, and are calculated to hold out for a submergence lasting ten hours. If the supply of air should fall after nine or ten hours the tank can be replenished by means of a tube projected to the surface as a suction pipe.

The electrical equipment of the boat is noteworthy for the amount of power developed from apparatus occupying so limited a space. The source of supply consists of sixty chloride accumulators which are built into one compartment 15 feet long, 6 feet wide and 30 inches high. The weight of the batteries is so distributed that they are held firmly and cannot be thrown out of alignment or injured by displacement. This compartment is located at about the centre of the boat. The cells are capable of discharging 300 amperes per hour for six hours, and their aggregate weight is 45,000 pounds. The discharge may be increased to 1,000 amperes per hour when unusual speed is demanded. The cells are constructed of steel, lined inside and out with lead, and the plates are secured in the cells against any possible movement. A source of electrical energy is carried by the boat itself, so that she is independent of any central station outfit. Charging is accomplished by means of a dynamo driven by a gasoline engine, and is, of course, only attempted when the boat is on the surface. The arrangement is such that the 50-horse power Otto engine may be used to run the dynamo or to revolve the shaft in case of an emergency. The dynamo has a double wound armature with two commutators. Its normal capacity is 50 horse power, but it can be overloaded to 150-horse-power for at least two hours without excessive heating. The dynamo weighs 3,500 pounds. The armature speed is 800 revolutions. Other electrical

appliances consist of a 10-horse power motor used for running the air compressor and also in case of need to operate as a bilge pump.

A motor of ½-horse-power is used to ventilate the boat while beneath the surface by forcing the foul air out, its place being taken by fresh air from the reservoir. Another motor of ½-horse-power is employed for ventilating the storage battery compartment by means of a suction blower for carrying off the battery fumes during the charging.

The armament of the boat consists of one dynamite gun, one automobile torpedo tube and one aerial torpedo tube. These tubes and gun are discharged by compressed air, which not only performs this work, but immediately restores to the boat the weight lost when the projectile or quantity of dynamite has been discharged. The muzzle energy of the dynamite gun is 750 tons, a force powerful enough to carry the projectile to the point of attack, and, when the inherent energy of the explosive is considered, to destroy any object struck.

These tubes are capable of throwing to a distance of one mile a projectile weighing 180 pounds, and carrying 100 pounds of a high explosive. Immediately under this is an expulsive tube for a Whitehead torpedo, with the usual charge of 200 pounds of gun cotton; and pointing to the rear is a dynamite gun capable of throwing 100 pounds of a high explosive 100 yards or more through the water. When equipped for service the Holland would carry three Whitehead torpedoes, six shots for the forward gun and five for the after gun.

While all trials of this interesting boat thus far made have been of an experimental nature, yet they have demonstrated the fact that a speed of ten knots per hour may be maintained when running with the top awash, and her submarine speed has been established at about six knots per hour, which is certainly a most creditable performance, everything considered. The chief errors thus far developed have been in the amount and location of the ballast, and in the strength and accuracy of the torpedo tubes, and these, it is expected, will soon be corrected. The boat has already been accepted by the United States Government, and will form a part of the defences of New York.

### Trolley Freight in Massachusetts.

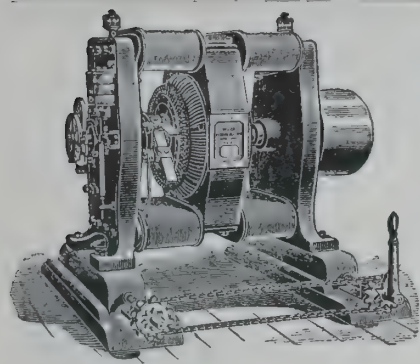
SEVERAL of the Massachusetts trolley companies have petitioned for permission to do an express business, and even carry freight. In some instances the bill presented to the Legislature contains a provision that the case shall be submitted to the people of the municipalities traversed. The Northampton Street Railway, which has had a provision for a two-thirds' popular vote to that effect, comes in with a petition to reduce two-thirds to a majority. It has held one referendum and failed to get the two-thirds. Officers in other places who believe that they can get the two-thirds do not object to it, but prefer to have the whole business done in the Legislature, without submission to the people. In one of the bills a provision was inserted for carrying goods to the weight of 100 pounds, and the vice-president of the road said that they expected to stop their cars at houses by the roadside long enough to take off these parcels. It was testified that the Northampton road has carried crates of strawberries, a quarter of beef and a barrel of flour. A bill was heard for a general law, but it was strongly opposed by corporation interests. There is a feeling that the progress of the times demands that larger powers be given to street railways in respect to express packages.

### Weather Signals and Street Car Lines.

THE trolley car has been utilized for all sorts of local announcements, with excellent results, especially in small communities, doing in its way much of the work that the old bell-crier was supposed to exist for. On rainy days a village car will often save the school children a useless tramp by carrying a placard with the inscription, "No school to-day," and in some places the local weather bureau now notifies the road of prospective meteorological changes, and the cars, as they go out of the car barn, mount the appropriate signal in the shape of a flag, flying between the trolley pole and the car. People can thus tell by a glance at the passing car whether to carry an umbrella or not and what sort of an overcoat to put on.

**Speed Acceleration on Electric Roads.**—One of the advantages of electric traction on suburban lines now being discussed by railroad and electrical engineers is the greater speed to be expected from the quicker starting of the trains. Mr. Lundie, of the Illinois Central Railroad, has mapped out a schedule for the contemplated electrical equipment of the suburban lines of that company, which involves an acceleration up to 40 miles per hour in twenty seconds.





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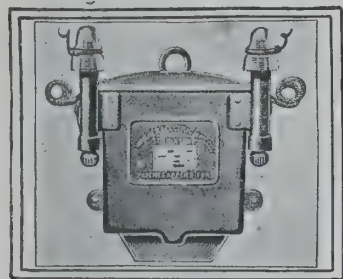
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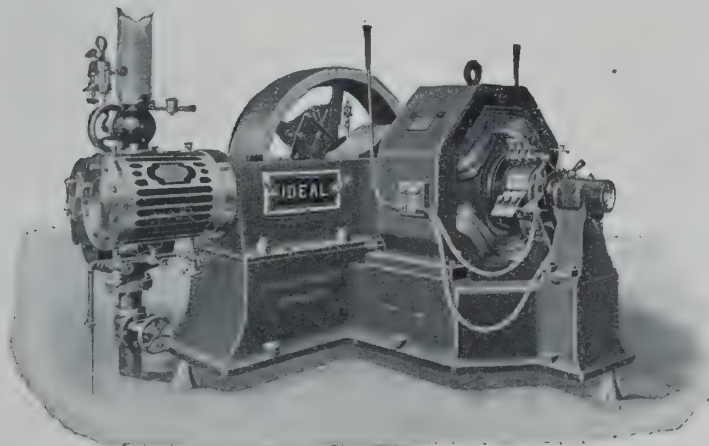
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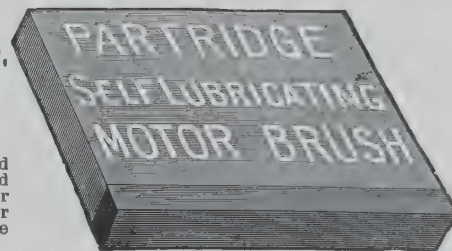
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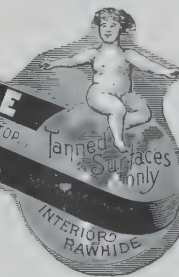
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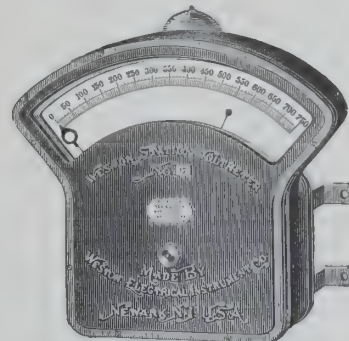
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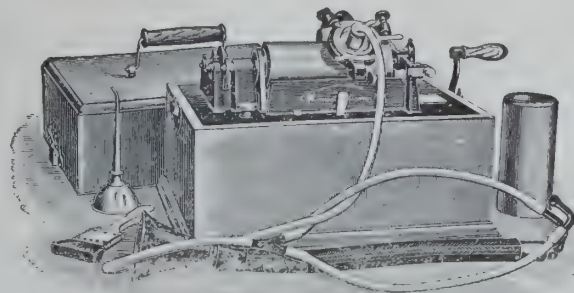
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## War Has No Effect on American Iron Trade.

THE *Iron Trade Review* says: "The iron trade has not regarded the declaration of war as any reason for suspending operations. On the contrary, some vigorous buying has gone on in the last week—not in conspicuously large orders, but in a steady filling of requirements that indicates confidence in the stability of business. It is realized that if buyers and sellers act on their knowledge of the inherent strength of the situation rather than the disposition toward pessimism that often shows itself in times of agitation, there will be no serious disturbance of industry. Material is being taken on contracts at a surprising rate, and in many cases new purchases have had to be made much sooner than was anticipated. So far as volume of current operations is concerned the situation has marked prosperity features. As for home consumption, there is no present apprehension that it will be greatly abridged, while millions of expenditure on war account will be added monthly. Pittsburg, which more than any other centre gauges the situation in finished material, gives encouraging reports for the past week. War requirements have been an insignificant element there, but demand from all sources is so large as to suggest that the certainty of war is a momentary stimulus. In a few lines prices are held more firmly, and in plates an advance of from \$1 to \$2 a ton has been made. Bridge, shipbuilding, steel car and boiler work have all contributed to filling up the plate mills. And while some proposed work is known to be held back, the aggregate of structural business is considerably beyond expectations. Southern iron has had the largest week's sales for the month, with some irregularity in price due to occasional marketing of warrant iron.

## The Stimulus of the Patent.

THE annual report of the Commissioner of Patents, some reference to which appeared in our last issue, contains so much of interest that our readers will welcome some additional abstracts of its contents.

The most striking and important feature of the Centennial Exposition at Philadelphia in 1876 was its display of the improvements in industrial arts brought about by American invention. It was believed by many that the inventions there exhibited represented the highest development possible; that there was no further room for improvement in many of the arts at least. Yet the effect of this exposition was not, as might have been expected, to discourage invention or to convince inventors that nothing more remained to be done, that the field of invention was exhausted, but rather to largely stimulate inventive activity.

All of the inventions displayed at the Centennial, and all of the inventions for which patents were taken out in the four years following, are now public property. Included in these are inventions of the highest industrial and commercial value. The dynamo and electric motor, the cotton-gin, the sewing machine and many other inventions of almost equal effect in revolutionizing important industries are, in the form in which they were made and used prior to 1880, uncontrolled by patents, and may be freely made, used and sold by any one. The influence of these inventions in the development of industries and the increase of employment cannot be doubted. They had much to do with the increase of manufactures from 123,025 establishments, with aggregate capital of \$543,245,351 and employing 958,079 persons, in 1850, the earliest census in which a distinct report on this subject is presented, to 253,502 establishments, with aggregate capital of \$2,780,766,895, employing 2,700,734 persons in 1880. The further increase to 322,638 establishments in 1890, with aggregate capital of \$6,139,397,785 and employing 4,476,884 persons, is to be noted in this connection.

But the influence of patented inventions is most strikingly shown in the creation of new industries of enormous magnitude since 1880—that is, within the term of patents now in force or but very recently expired.

Though no separate statistics are given for the basic steel process, by which steel free from phosphorus and therefore capable of being worked cold, is produced, there can be no doubt that this process, invented not long prior to 1880, and first extensively used in that year, has had much to do with the large increase of the production of steel and its use for tubing and structural purposes. The manufacture of iron and steel in 1880 employed 140,978 persons; the same industry in 1890 employed 152,535 persons.

The linotype machines, automatic weighing machines, etc., all represent industries of very considerable importance, in which millions of money are invested and many hundreds of men are employed.

It is to be noted with respect to the new industries based on patented invention that none of them were immediately successful. The public is not quick-

to accept new inventions until their practical value has been amply demonstrated. The electric light was believed impracticable, and in its first installations was met by practical difficulties hard to be overcome. The cash register and cash carrier met with serious opposition at first, and it was years before the bicycle was made acceptable to the general public.

None of the inventions on which these new industries are based were, in the form in which they were first patented, commercially practicable. Even if it be conceivable that the primary inventions would have been made without the stimulus of the patent system, there would have been no inducement to inventors to spend time and money in perfecting and improving these inventions without the certainty that if made practicable and acceptable to the public their manufacture, use and sale could be controlled for a term of years through the protection afforded by patents. If a new device may be freely copied by rival manufacturers as soon as it appears upon the market, no one can afford to expend the large sums of money which are often found necessary in perfecting the invention, in constructing the plant necessary for its manufacture and in bringing it before the public. It is stated that a new form of sewing machine for a special use cost in the preparation of jigs, dies and other facilities necessary for the economical manufacture of its parts upward of \$50,000 before a single machine was ready for sale. But for the fact that the manufacturers had the assurance of an exclusive right to manufacture the machine through their ownership of the patents granted for the inventions which it embodied no such sum could have been expended, and the public would have had to be content with the inferior machines previously on the market.

To the stimulus afforded by the Patent Office is due the creation of these new industries and the very great development of recent years in the older industries. It is to the stimulus to invention given by our patent system that the great increase in our exports is largely due, and it is on American invention, as fostered and stimulated by the patent system, that we may confidently depend for ability to maintain the high rate of wages paid to American workmen and yet to compete successfully in the markets of the world with nations where the workman receives but a meagre return for his labor.

## A German Cable to the United States.

IT is officially announced that Germany will shortly begin laying a separate cable to the United States. On this point a paper which is published in Munich says:

"The beginning has already been made by the laying of the cable from Borkum, an island in the North Sea belonging to Prussia, to Vigo, a Spanish seaport town, a distance of some 1,200 miles. The next extension will be to the Azores. The cable to the United States is especially necessary, for the trade relations with that country become more important every year. Our postal service with the United States is already ahead of all others, no other country being able to furnish a line of fast steamers for the delivery of mails such as we have. But with regard to the cables, we are still dependent upon the British companies. France, tired of the tutelage exercised of late by the British, has at last laid down her own wire, and Spain, too, is about to form a cable connection of her own with the New World. We cannot, of course, lay down a net as extensive as that which Great Britain has created within the last fifty years, but we can, after some delay, furnish connections which will benefit not only our own trade, but that of the Netherlands, Denmark, Sweden, Norway, and Russia as well."

The *Kreuzer Zeitung*, the old Conservative paper in Berlin, thinks the laying of separate cables would not be necessary if the English did not "doctor" every scrap of news sent between the Continent and America to suit their own purposes. In its characteristic way it charges that they would tie up the lines altogether if they could benefit thereby.

**American Ship Plates for Belfast and the Clyde.**—The announcement made in our columns last week that an order for 3,000 tons of American ship plates had been given by a Belfast firm, is now followed this week by an order for 5,000 tons of plates given to the Carnegie Steel Company for shipment to the Clyde. This is perhaps the most serious news of its kind that has yet been published. Whatever the Americans can do in billets, cheap qualities of wire, in beams of heavy section or in low grades of foundry iron, it had at least been hoped that in acid open-hearth shipbuilding plates the English makers could sell against the world. An examination of an interesting table compiled by Mr. Head, given elsewhere in this issue, shows, however, that at present prices American plates at Pittsburg are some 18s. a ton cheaper than English ship plates at Middlesbrough.—*Iron and Coal Trades Review*, London.



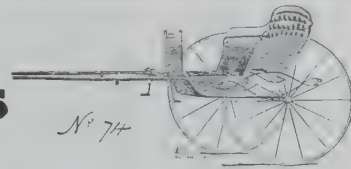


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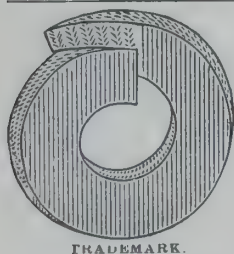
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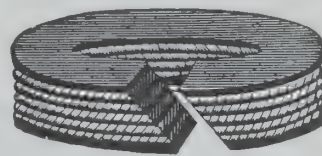
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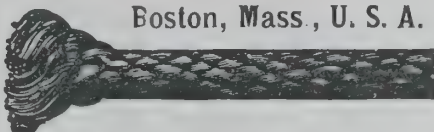
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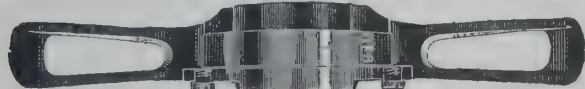
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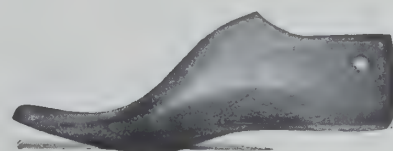
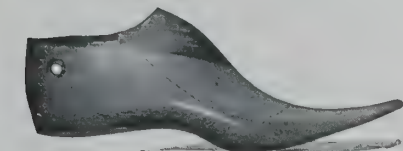
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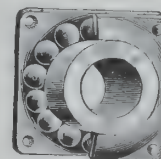
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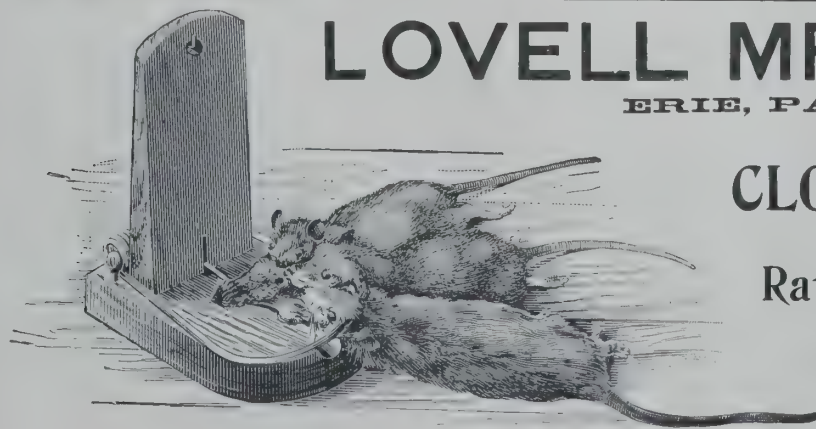
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BUFFALO FOOT CYCLE COMPANY, 985-995 Ellicott Square, Buffalo, N. Y., U. S. A., issue an illustrated booklet entitled "Did You Ever Cycle Afoot?" It contains an account of the foot cycle manufactured by them and elaborate suggestions concerning the management of a foot-cycling academy.

THE LUNKENHEIMER COMPANY, Cincinnati, Ohio, U. S. A.: 1298 catalogue of brass and iron valves, injectors, whistles, lubricators, oil and grease cups and steam specialties; 208 pages, fully illustrated, and contains numerous tables of value to users of these specialties and an index. Full specifications and directions accompany descriptions of each article.

CHADWICK COPYING BOOK COMPANY, Springfield, Mass., U. S. A. Descriptive catalogue and price list of a great variety of copying books, including styles for travellers, dispensing with press, telegram duplicating sheets, railroad copying paper and way-bill impression books, etc., ruled invoice or sales copying-books and other supplies of a similar nature. Illustrated.

BUFFALO WHEEL COMPANY, N. Y., U. S. A.: 1898 catalogue of Niagara bicycles manufactured by this firm, showing the various models for the present year, with specifications for regular equipment of each and list of options offered. A detailed and elaborately illustrated account is given of the various improvements effected in this wheel for the coming season.

PITT & SCOTT, 39 Broadway, New York, U. S. A., announce that they will soon publish a book for the information of shippers and persons interested in foreign trade, entitled "Foreign Import Duties and Foreign Shippers' Handbook of Useful Information." The price will be \$1.50.

### Prominent Exporters Find That Trade Is Good in Spite of the War.

IN order to ascertain the exact facts regarding the situation in the export trade THE AMERICAN EXPORTER addressed a large number of leading exporters all over the country asking their views as to the situation as it presented itself to them. It is not possible in the space at our disposal to reprint all of the replies here, and as some of them were confidential we are not at liberty to state the names of all our correspondents. The letters, however, display a remarkable unanimity of opinion that the effect of the war is extremely slight. In only two cases were our correspondents enjoying less than their usual foreign trade at this time of year, and in each instance they attributed the falling off to local conditions, in one case to the low price of coffee in South American countries, in the other to the high rates of exchange.

In several instances manufacturers reported that domestic orders showed a considerable falling off, while their foreign business was increasing. Manning, Maxwell & Moore, The Pelton Water Wheel Company, The J. A. Fay & Egan Company, James Leffel & Co., and many others report that the war has as yet had no effect whatever upon their trade. The following circular letter is being sent to the foreign clients of a group of prominent manufacturers who, however, request us not to publish their names. It states clearly and correctly the exact situation and deserves the widest possible circulation and implicit confidence:

*To Our Customers:*

Owing to the large number of letters being received by us from our friends in foreign countries, asking us whether the war now existing between this country and Spain will, in any way, affect the prompt execution of orders and shipping of goods or not, we have decided to issue this joint circular.

There is no reason for you to have any anxiety on this account as the war in no way interferes with our manufacturers or the shipping of our goods except in the way of marine insurance.

We, the undersigned, give notice that, until further notice, we will when making shipments to you of goods made by ourselves cover the same with a special war risk insurance at our own expense, the regular marine insurance to be paid by you as heretofore. This will make the shipment of goods as safe as heretofore without extra expense to you.

Do not hesitate to send on your orders, they will have our usual prompt attention.

Thanking you for past favors, we remain, etc.

### Export Notes.

—The Maryland Steel Company recently shipped 3,000 tons of steel rails to India, which are to be used in the construction of the East Indian Railway.

—*Dun's Review* for April 9th says: "A contract in competition for cast pipe for St. John, with \$2 difference in duty against the American bidders, was taken by a Pennsylvania concern at \$27.80, against \$28.50 by the lowest Canadian, and \$31 and upward by English concerns."

—Twenty American electric street cars were recently delivered in Berlin and 100 more have been ordered. They were wanted quickly, and therefore the order was placed with an American firm that was able to deliver them in Berlin at the same price and in about one-fourth of the time required by German manufacturers.

—The Wason Manufacturing Company, of Springfield, shipped to the Brazilian Government some time ago six railway cars. The outside finish of the cars was mahogany, treated in natural color, as this wood not only retains its beauty in the climate of Brazil but grows richer by exposure. The decorations were very elaborate.

—Two powerful steam navvies were shipped by the Toledo Foundry Company, of Toledo, Ohio, to the order of a railway company in Yokohama. These excavators weigh about thirty tons each, and have an individual capacity of 1,500 cubic yards a day. It is said that these are the first steam navvies sent from the United States to a foreign country.

—The Yukon River steamboat Fortune Hunter, which was recently shipped overland to the Pacific Coast in sections, was built during the past Winter by the Marine Iron Works, of Chicago. The Marine Iron Works are known throughout the world as builders of marine engines and of light draft river steamboats. They have in recent years completed thirty two craft of this kind for use on the Amazon River in South America.—*The Chicago Chronicle*.

—There is little that is discouraging in the experience of the Engelberg Huller Company, of New York. It makes and deals almost exclusively in coffee-cleaning and rice hulling machinery, and has customers in nearly every part of the world where rice grows or coffee is picked. Recently the company shipped thirty or forty rice hullers to India, and two or three complete rice-cleaning plants to Bombay. A like outfit has just been shipped to Frontera, and will be put into operation in the Tobasco district.

—The Pelton Water Wheel Company has recently sent to the Alaska Treadwell Company a single wheel 7 feet in diameter, which furnishes power enough to run the largest stamp mill in the world. It has 240 stamps, 96 concentrators, ore breakers and other machinery, which together require some 500 horse-power. This New York house recently made the first shipment of the machinery for the Compañia de Papel, of San Rafael, in Mexico. There are to be two complete plants, one to have two Pelton wheels of 11 feet diameter, to make 212 revolutions per minute and give 550 horse-power. The second plant is to have two wheels of 60 inches. Yet another plant is at work for the San Ildefonso Power Company in Mexico.

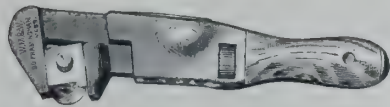
### The American Railway Car Abroad.

A NOTABLE development in our recent export trade is the shipment abroad of railway cars. Our locomotives have secured a firm foothold in different parts of Spanish-America and in China and Japan, notwithstanding the fact that our engine is of a type different from that which European manufacturers have made familiar to the world. American cars, too, are somewhat sui generis, though when they are once known abroad they may gain a merited popularity. If we are to sell them for use on foreign railways, foreign tastes must gradually come to conform to our product, or else we must build to suit other tastes, which is the wisest and most certain course to pursue in the long run. Vestibule cars with centre aisles are winning favor in some parts of Europe, but the type as yet is for the most part very different from this. Cars or wagons, as the English call them, which are divided into coupes or compartments, and which are entered through doors at the side, are still generally employed in Europe and in nearly all other parts of the world which draw their railway equipment from European workshops. Our tram cars have been going abroad for some time, and lately a few rather large orders for railway cars have been taken by car building firms in Delaware and Eastern Pennsylvania. These contracts, it appears, have often been for freight cars, which are more or less alike, except for size, the world over. A few days ago, it is of interest to note, a Pennsylvania company took an order from the Orange Free State Government for 100 "gondola cars" and for fifteen passenger cars, which are soon to be forwarded to South Africa.



**WHITING MFG. CO.,**South Framingham,  
Mass., U. S. A.

MANUFACTURERS AND EXPORTERS OF

**Whiting's "Ratchet-Action" Wrenches.**Sold direct or through export commission houses.  
Correspondence solicited. Circular E on request.**Fine Saddlery Hardware for EXPORT.**

Orders filled through Commission Houses. Correspondence solicited. Catalogue "B" on application.

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NASHUA, N. H., U. S. A.

Harness Saddle Trees (in iron), Gig, Track, Coupe, Express. All styles and sizes.

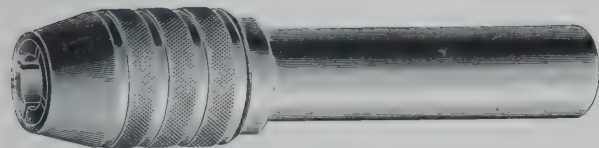
Harness Saddle Mountings, such as Terrets, Check Hooks, Etc., Etc. All Patterns.

Brass, Nickel and Imitation Rubber Finish.

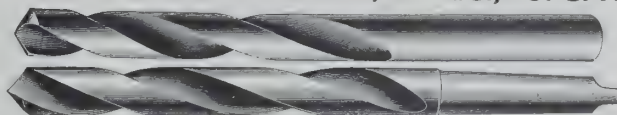
**STRANGE FORGED DRILL AND TOOL COMPANY,**

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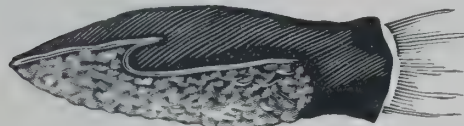
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Orders filled through Commission Houses

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**SHEEP SKIN MITTEN,**Acknowledged to be the best article for **POLISHING STOVES**, as it does away with the old-time dirtiness of the work, making this work a pleasure. Also invaluable for polishing brass or glass, or silverware which it does not scratch. For tan shoes and cleaning bicycles it has demonstrated itself a conspicuous success.

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**DIAMOND HARDWARE CO.****EVAN LEIGH & SON,**

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**Commission Merchants,****Freight and Insurance Agents.**

Orders promptly executed for Engines, Boiler Turbines, Roofing, Shafting, Belting Machinery, Card Clothing, Bobbins, Spindles, Flyers, Ring Travellers, Pickers, Healds, Reeds and all other Machinery Accessories, and Mill Supplies, Yarns, Paints, China Clay, Chemicals, Etc.

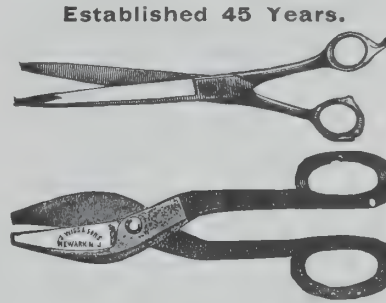
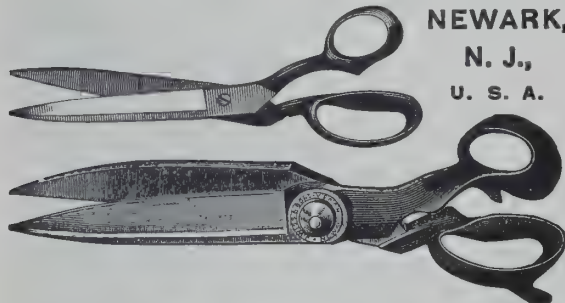
**Bi-Weekly Attendance Manchester Exchange.**

Cable Address: "LEGH LIVERPOOL."

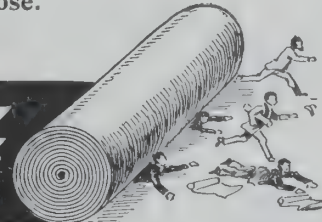
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**NEWARK, J. WISS & SONS,**N. J.,  
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BEST QUALITY**Shears AND Scissors,**STRAIGHT AND BENT TRIMMERS,  
TAILOR SHEARS, BARBERS' SHEARS, TIN OR METAL  
SNIPS, PRUNING SHEARS, LADIES' SCISSORS,  
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The Leading House.

**H. WM. DOPP & SON,**

MANUFACTURERS OF

**Soap Makers' and Butchers' Machinery,**

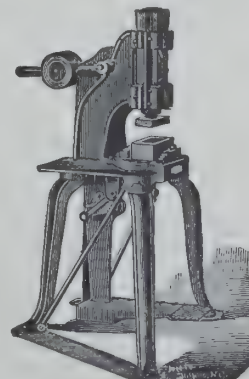
462 Ellicott Street, Buffalo, New York, U. S. A.

Swing Foot Lever Soap Presses, Nos. 1 and 2. Combination Foot and Steam Power Soap Presses. Improved Soap Remelting Catchers, either with or without 8 Horse Power Engine attached. Seamless Steam Jacketed Kettles. Steamed Jacketed Toilet Soap Kettle, with Agitator (three different styles). Steam Jacketed Rendering and Refining Kettles.

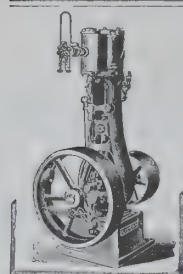
Improved Lard Dryer, Mixer and Cooler. Steam Jacketed Vacuum Pans, Hotel Kettles for Boiling and Steaming in Hospitals, Institutes, Barracks, Hotels, Asylums, &amp;c., &amp;c. Steam Jacketed Glue Pot Heaters. Iron Soap Cutting Frames, with Adjustable Wires. Soap Dies, for Stamping and Moulding the Soap. Hand Stamps, Steam Traps, with Balanced Valve, &amp;c.

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## Automatic, High-Speed, Vertical and Horizontal, Center-Crank, Self-Contained Engine.

NEAT AND SIMPLE IN DESIGN,  
HAS LARGE WEARING SURFACES,  
MATERIAL AND WORKMANSHIP FIRST-CLASS.

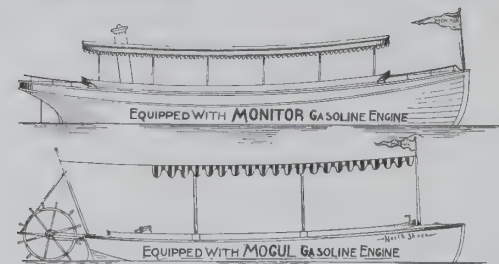
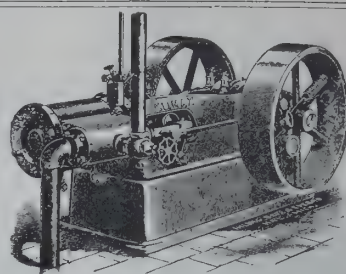
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ALL PARTS INTERCHANGEABLE.

Particularly adapted for Electric Lighting, or any purpose requiring very close regulation.

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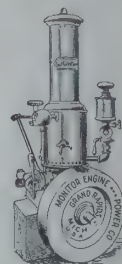
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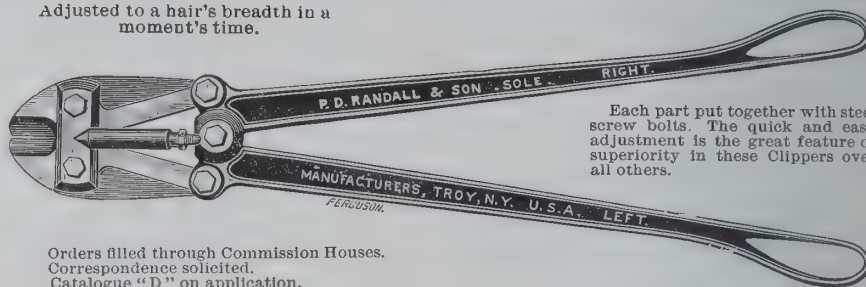
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No weak spots in the whole Clipper. Knives tempered in the most careful manner. Every Clipper thoroughly tested before it leaves our factory. No. 3 cuts 3/8 inch or less; No. 4, 1/2 inch or less; No. 5, 3/4 inch or less. Address

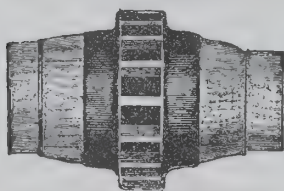
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Adjusted to a hair's breadth in a moment's time.



Each part put together with steel screw bolts. The quick and easy adjustment is the great feature of superiority in these Clippers over all others.

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HUB BLOCKS.



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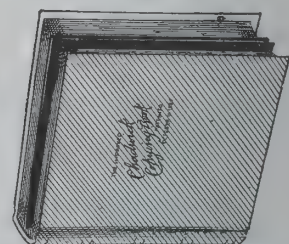
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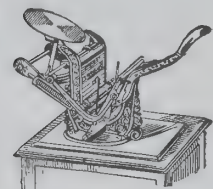


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Send for our catalogue  
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Also a full line of the  
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For Export Trade

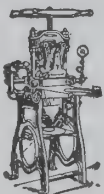


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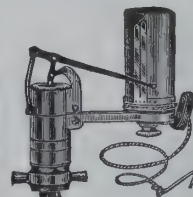
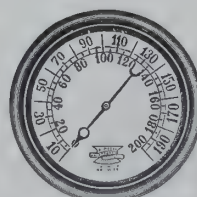
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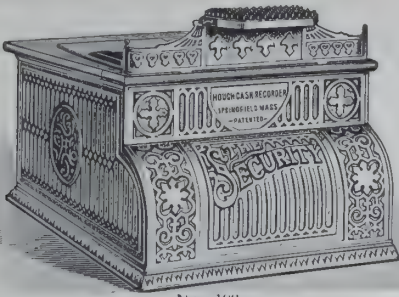
Water Relief Valve.

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No. 100.

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This is overcome by using the "**Security**," as you cannot open the money drawer and **forget** to make a record that **might** want to be referred to at **any** future time.

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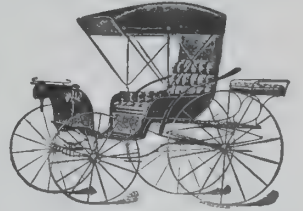
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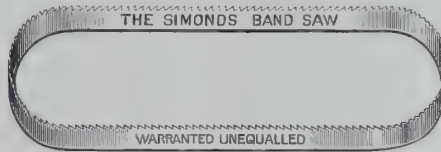
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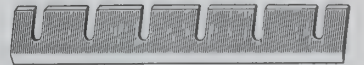
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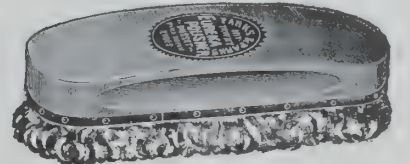
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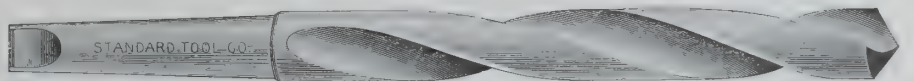
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They are made **RIGHT.**



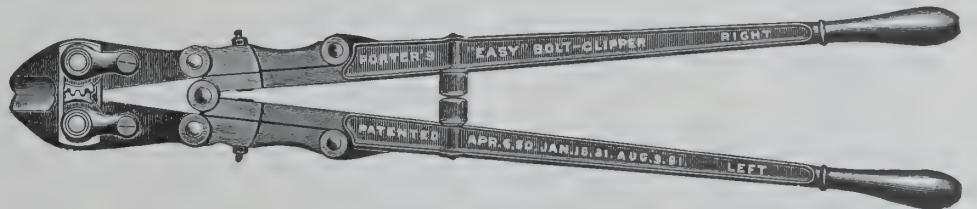
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Manufacturers of

**THE "Easy" Bolt Clipper**

**IS THE BEST.**

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BLENDERS OF OILS AND MANUFACTURERS OF

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**NONE GENUINE WITHOUT TRADE MARK.**

520 & 522 W. FRANKLIN STREET,

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Correspondence solicited. Shipments direct or through any Export Commission House.



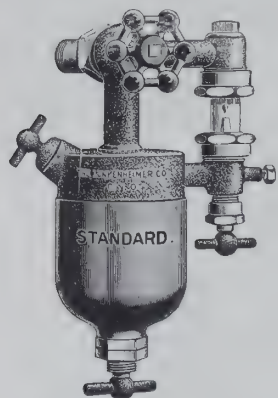
TRADE MARK.



TRADE MARK.



# Lunkenheimer's "STANDARD" BOILER OIL INJECTORS



Effectually prevent the formation of scale in boilers, thereby saving fuel, foaming, pitting and leaky joints. These injectors have but one connection, are simple and strong, feed visibly oil drop by drop, and are perfect in every respect. Many thousands in use and giving entire satisfaction. Made in the following sizes: ½ pt., 1 pt., 1 qt., ½ gal., 1 gal., 1½ gal., 2 gal. Full directions with every injector. Satisfaction guaranteed. Specify "Lunkenheimer" make and order through export commission houses.

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Branches: 26 Cortlandt St., New York; 35 Great Dover St., London, S. E.

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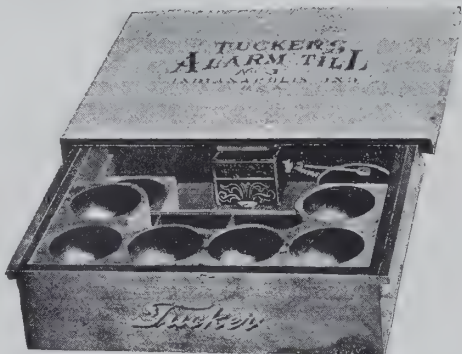
A PERFECT DAY SAFE. THE ACT OF CLOSING LOCKS THE TILL. OVER ONE MILLION NOW IN CONSTANT USE.

No key to be lost.

Susceptible of 32 changes.

Opens like a common drawer.

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Handsomely finished in Walnut, Oak or Cherry Woods.

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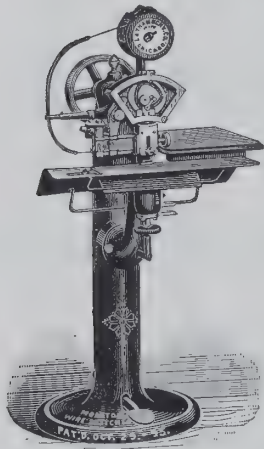
As a piece of cabinetwork, well worth its cost.

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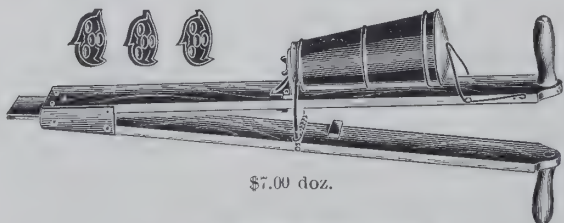
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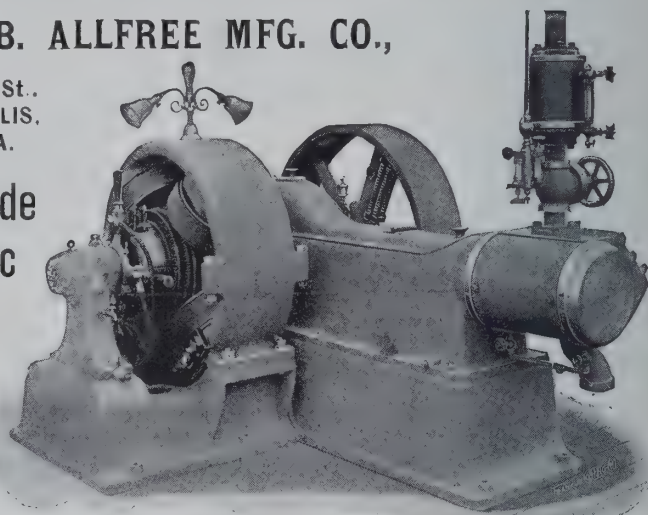
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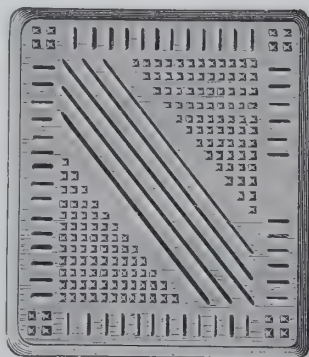
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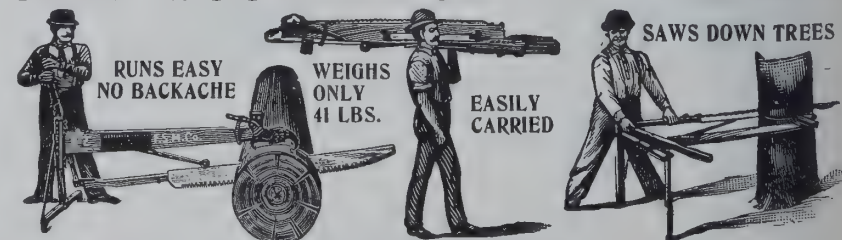
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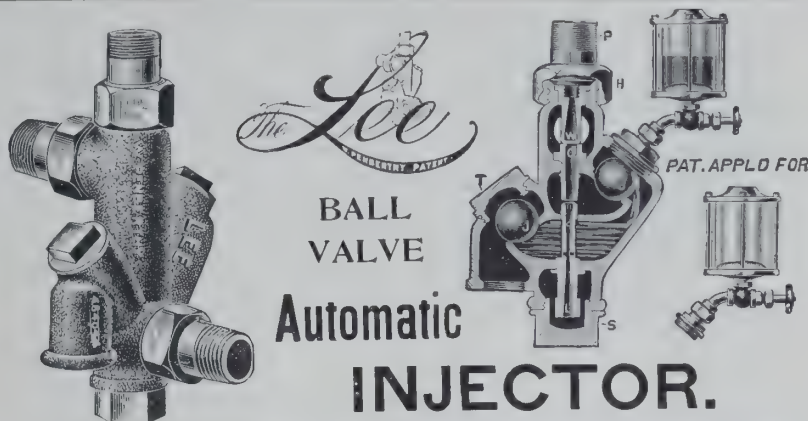
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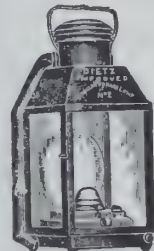
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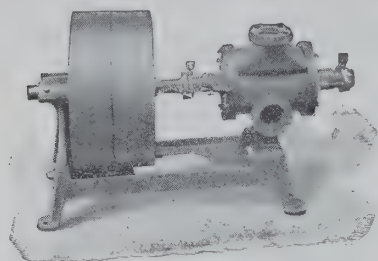
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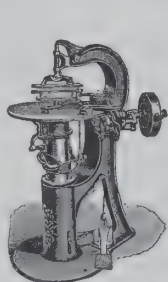
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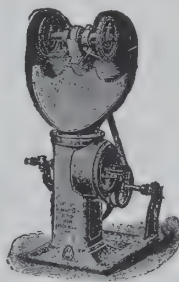
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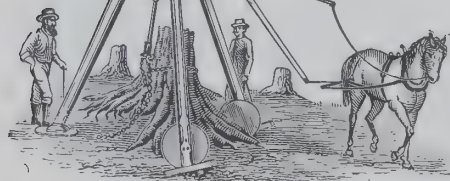
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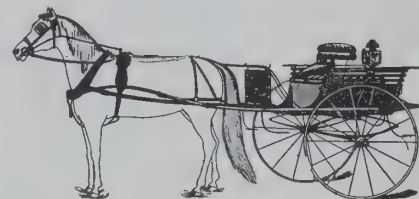


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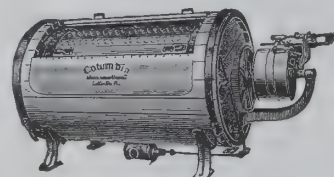


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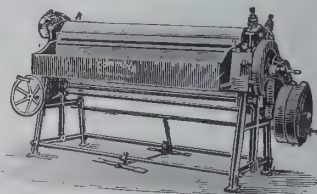
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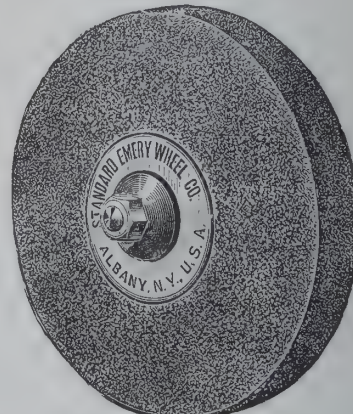
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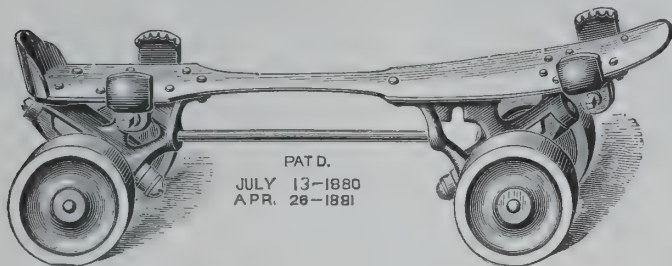
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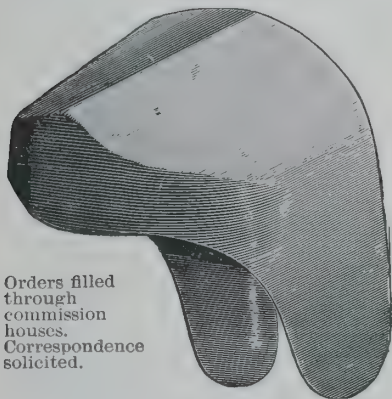
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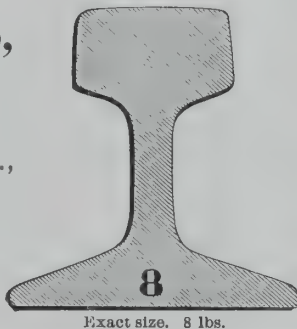
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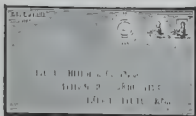
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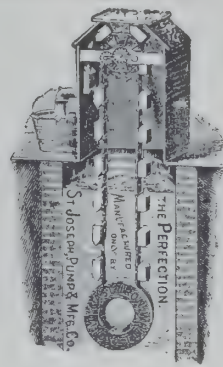
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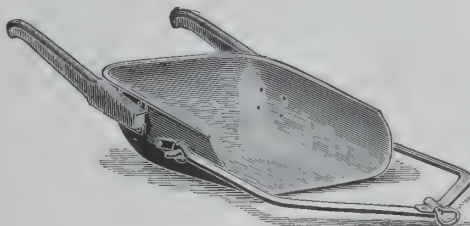
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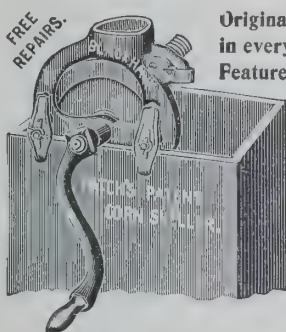
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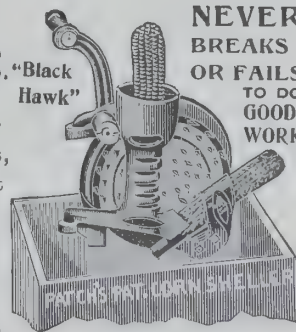
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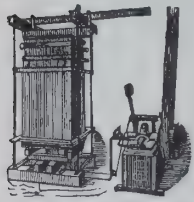
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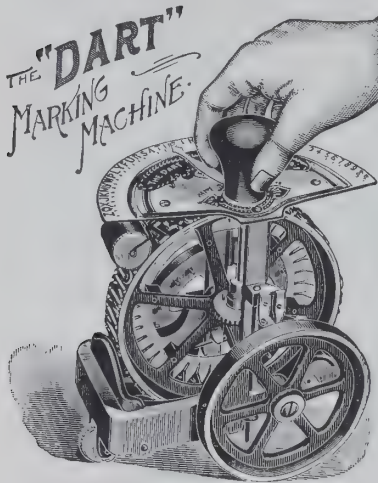
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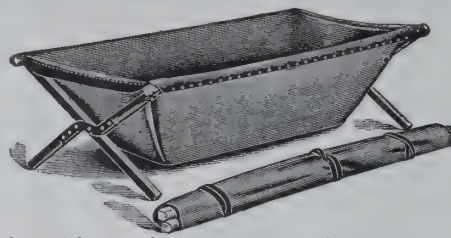
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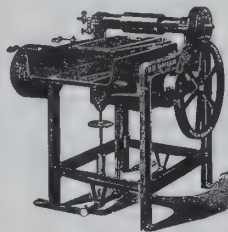
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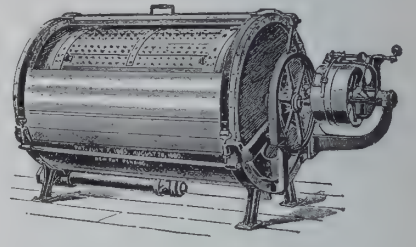
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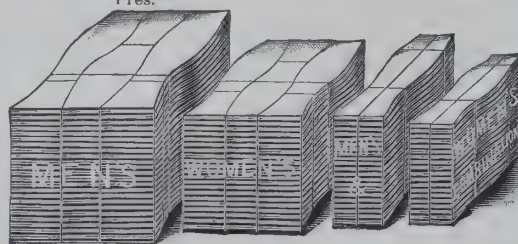
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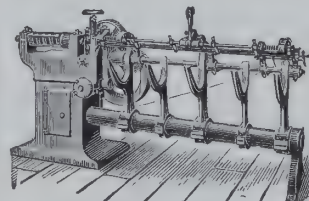
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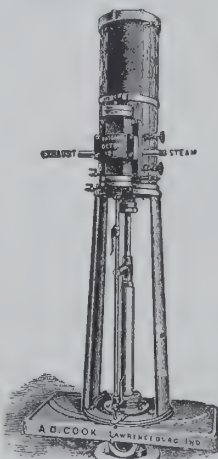
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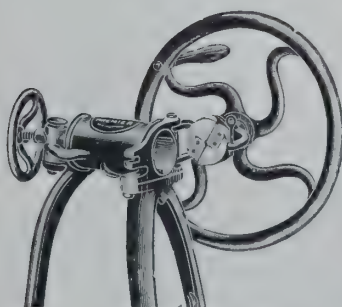
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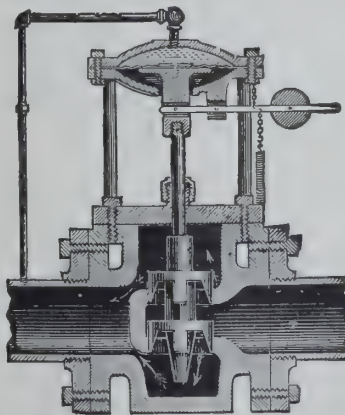
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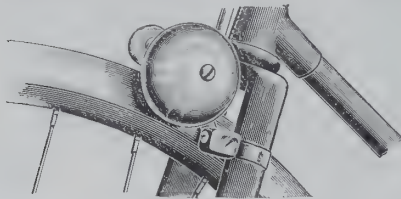
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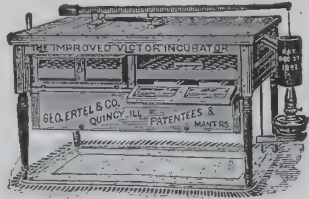
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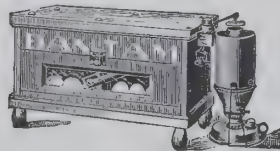
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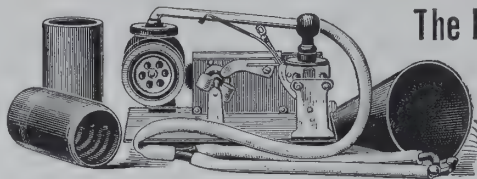
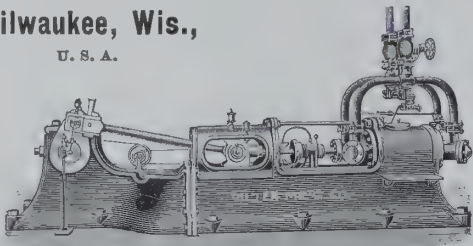
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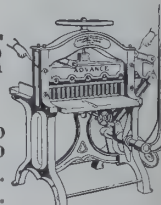
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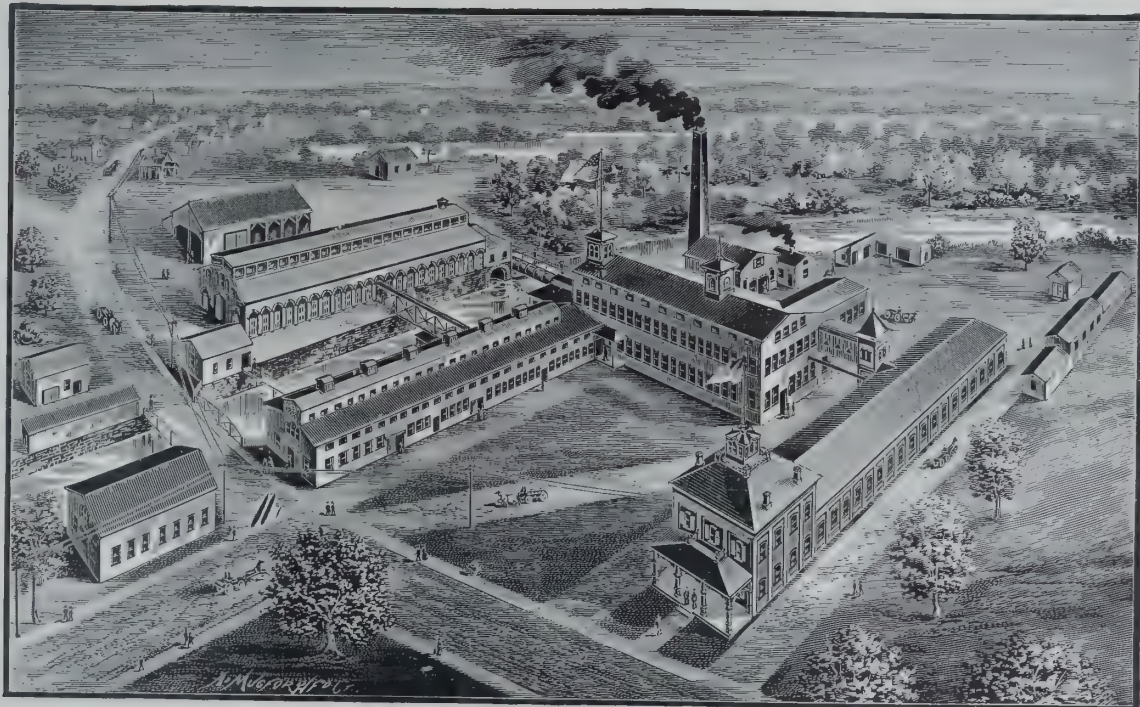


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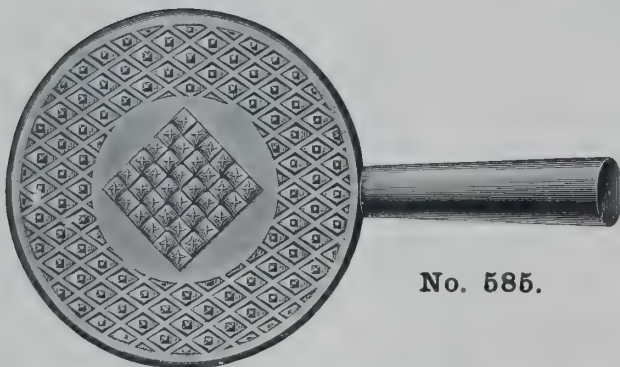
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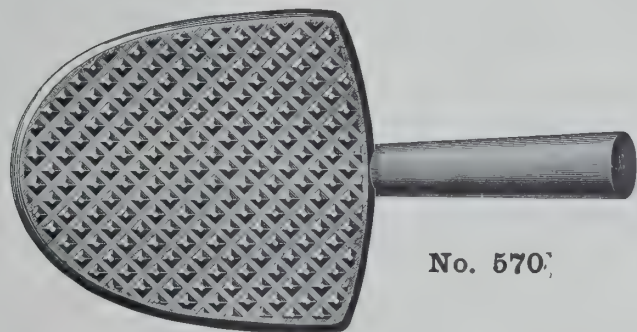
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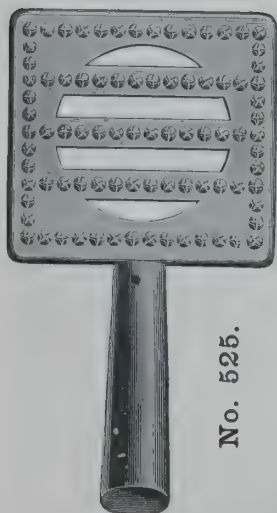
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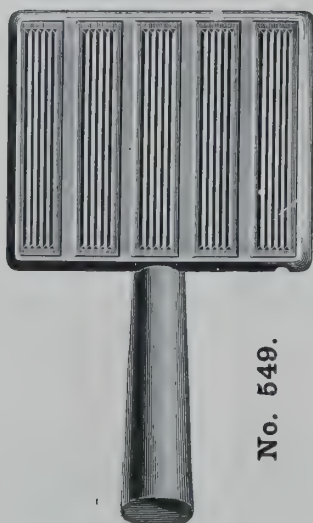
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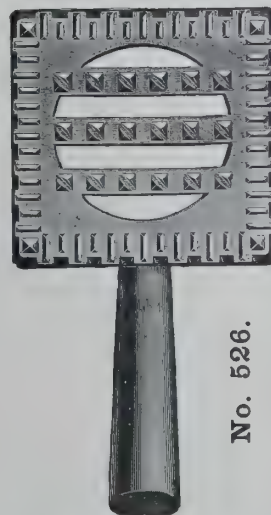
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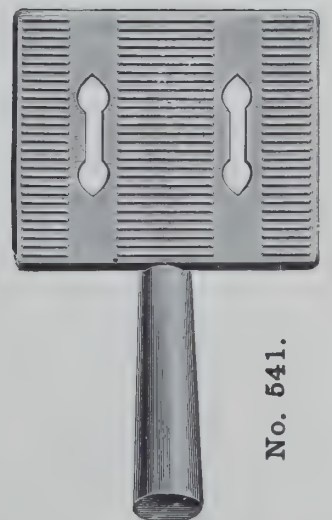
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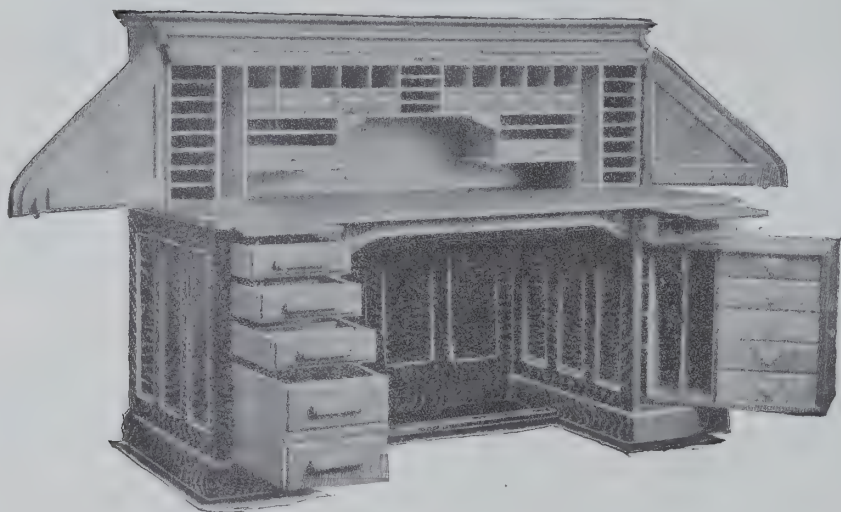


# DESKS!

# DESKS!!

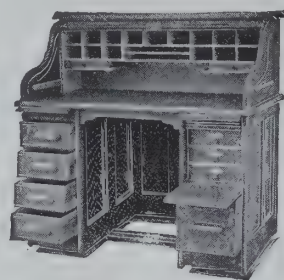
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We make a complete line of fine Office and Library Furniture, including Roll Top Desks, Flat Top Desks, Bookkeepers' Desks, Typewriter Desks, Letter Files, Card Indexes, Revolving Desk Chairs, Book Cases and a complete line of luxurious Turkish leather Easy Chairs and Couches. We illustrate and quote prices on the few desks below to give an idea of our line and prices of desks. We issue FOUR Complete Catalogues, any one or all of which will be mailed, together with prices, to any address upon request.



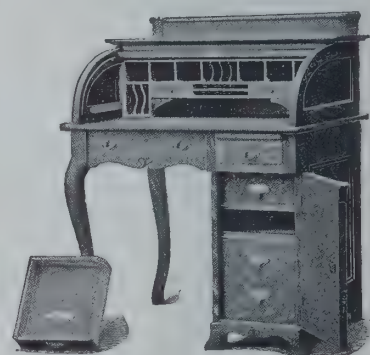
NO. P. 301, "A."

**\$45.00** buys this desk exactly as illustrated. It is 66 inches long, 33 inches wide, 51 inches high. It is made of the finest selected quarter sawed white oak, and has swinging side arms and FIVE COMPLETE LETTER FILES. 66 inches long, style "A," \$45.00. Style "B" or "C," \$41.00. 72 inches long, style "A," \$49.00. Style "B" or "C," \$45.00.



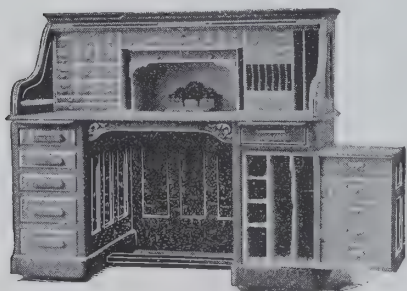
NO. P. 10 E.

**\$19.75** buys this desk exactly as illustrated. It is 48 inches long, 30 inches wide, 51 inches high. It has quarter-sawed oak front, closed back and THREE LETTER FILES in right pedestal under lock and key. This desk has been A GREAT SELLER.



NO. P. 243, STYLE "B."

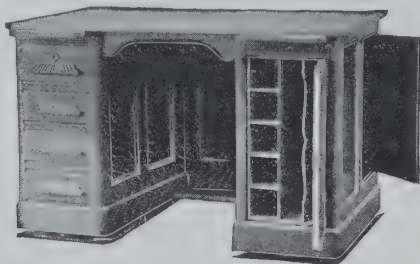
**\$17.00** buys this desk exactly as illustrated. It is made of quarter-sawed white oak and is supplied with LETTER FILES and large drawer in right pedestal. Size, 36 inches long, 28 inches wide, 44 inches high.



NO. P. 212, STYLE "A."

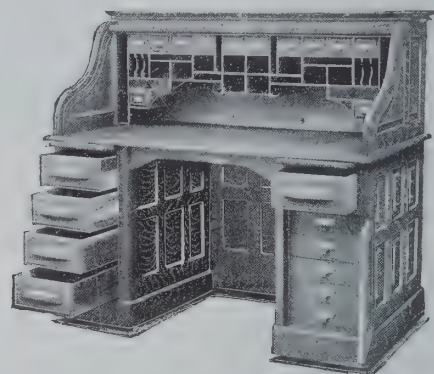
**\$43.50** buys this desk exactly as illustrated. It is 60 inches long, 33 inches wide, 52 inches high. It is an extra fine desk, made of quarter-sawed white oak and has FIVE COMPLETE LETTER FILES in the right swing pedestal.

60 inches long, style "A," \$43.50.  
Style "B" or "C," \$40.00



NO. P. 216, "C."

**\$11.60** buys this desk exactly as illustrated. It is 50 inches long, 30 inches wide, 31 inches high. It has closed back and is made of selected oak. Style "B" or "C," \$11.60.



NO. P. 241, STYLE "A."

**\$35.00** buys this desk exactly as illustrated. It is 55 inches long, 32 inches wide, 51 inches high. It is made of the best figured quarter-sawed oak or cherry, and has FIVE COMPLETE LETTER FILES in right pedestal.

50 inches long, style "A," \$32.50. Style "B" or "C," \$27.50.  
55 inches long, style "A," \$35.00. Style "B" or "C," \$30.00.  
60 inches long, style "A," \$37.50. Style "B" or "C," \$32.50.

## INFORMATION.

ALL PRICES given above include cost of boxing and delivery to New York City ready for export.

ALL DESKS are made of the best quality of white oak and are supplied in either light, medium or dark finish to suit purchaser, medium being supplied unless otherwise requested. All our desks are finished with best quality of piano polish finish.

ORDERS: We are well known to the leading export merchants of New York City, any of whom will be pleased to execute orders for our goods.

CONSTRUCTION AND PACKING: We have made a careful study of the needs of the export trade in this matter, and all desks are made with our "sectional construction," permitting them to be quickly taken apart and put together. This construction also permits snug packages, insuring both safe delivery and lowest freight rates.

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Makers of Office and Library Furniture.

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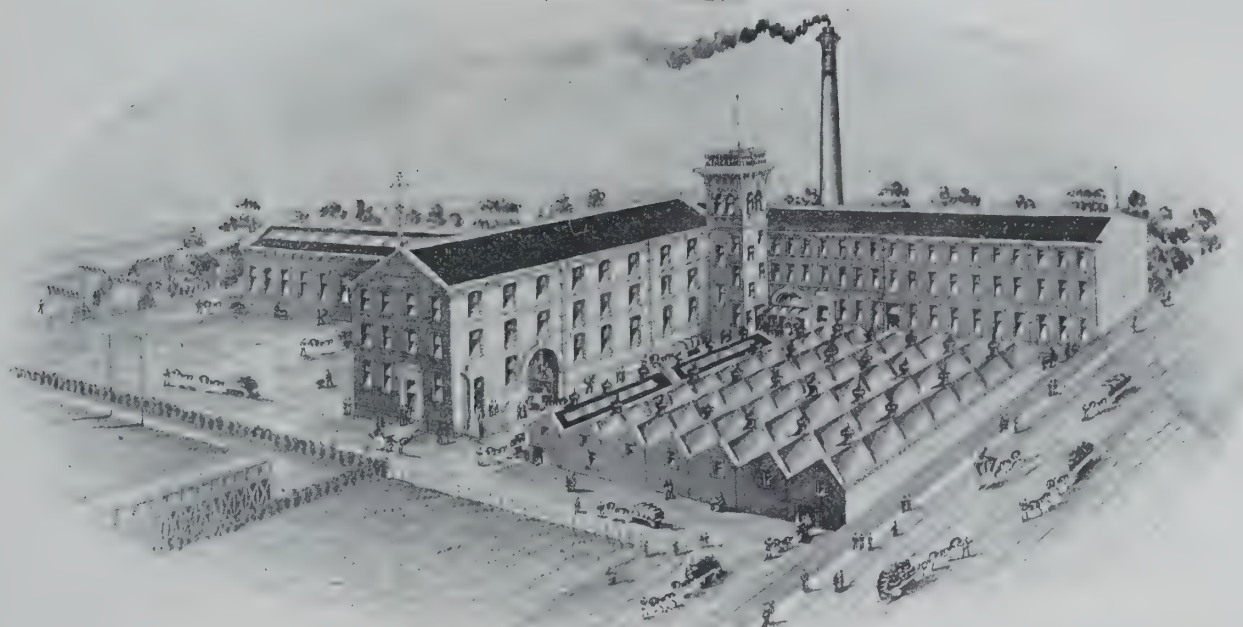


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polishes quicker and easier, and requires less of it to do the work. Large size, per gross, \$8.50; discount 10 per cent. Small size, per gross, \$5.00; discount 10 per cent.

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package contains a 2-oz. bottle of russet leather cleaner and a small decorated tin box of russet leather polishing paste. The cleaner removes the dirt and stains, and the paste adds a brilliant, durable and waterproof polish. Price per gross, \$8.00; discount 10 per cent.

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For giving russet and yellow colored shoes a brilliant, durable and waterproof polish. Try it once and you will never be satisfied with any other polish. Per gross, large size decorated tin boxes, \$8.50; discount 10 per cent. Small size, \$5.00 per gross; discount 10 per cent.



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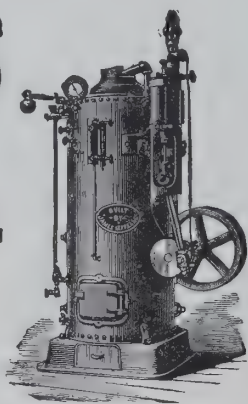
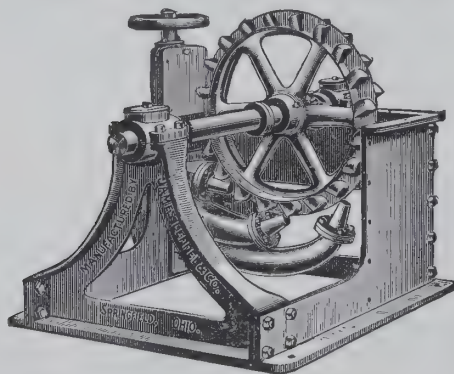
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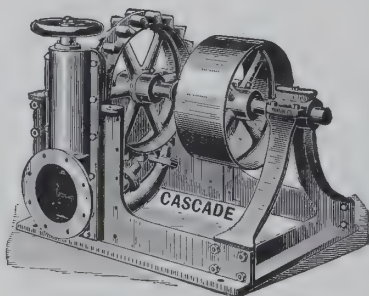
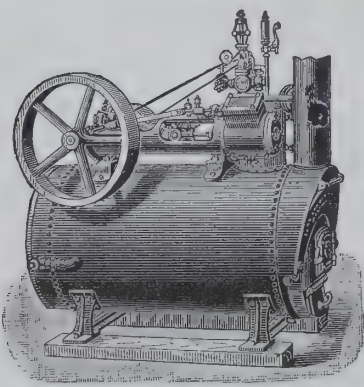
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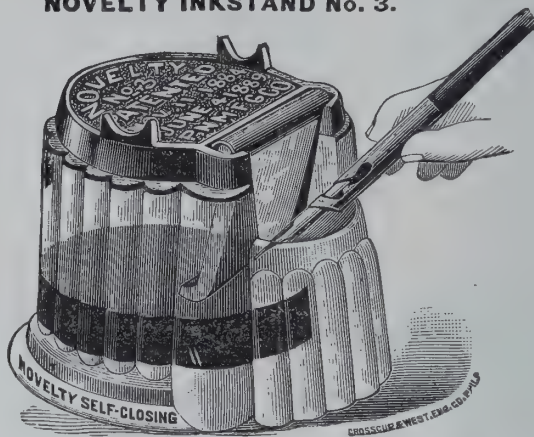
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Thirteenth & Noble Sts., Philadelphia, Pa., U. S. A.

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All our goods, numbering more than 50 different articles, are patented, controlled and manufactured exclusively by ourselves, and are sold all over the world, about one-half of our business being for export. They are all standard novelties in every sense of the word, and have been awarded numerous premiums at the universal expositions of Sydney, Melbourne, Adelaide, Barcelona and Paris, for novelty, workmanship, finish, simplicity, utility and cheapness.

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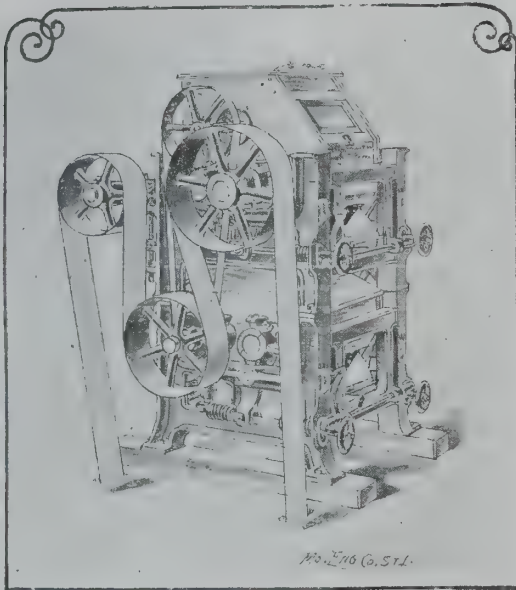
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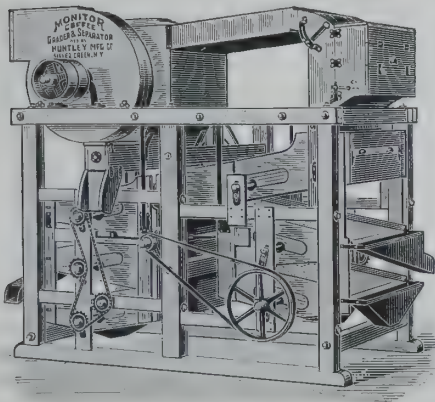
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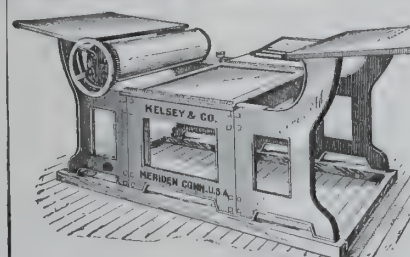
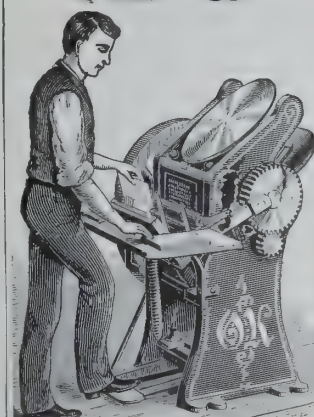
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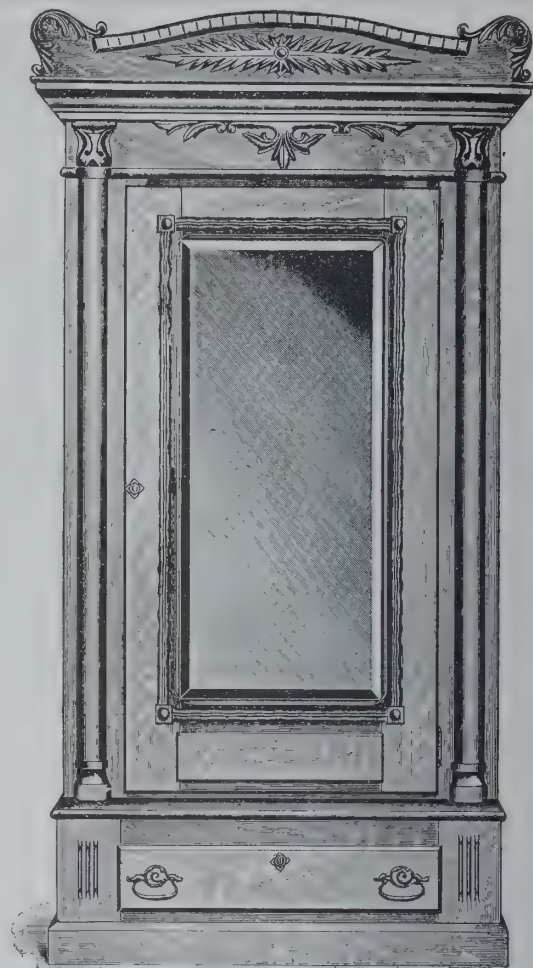




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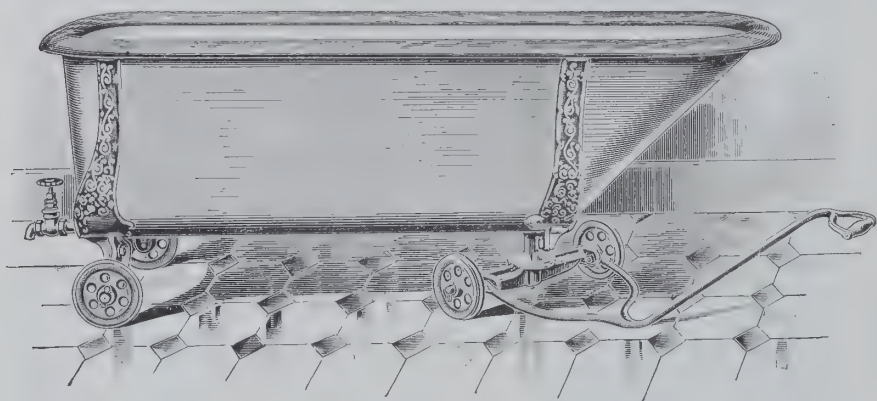
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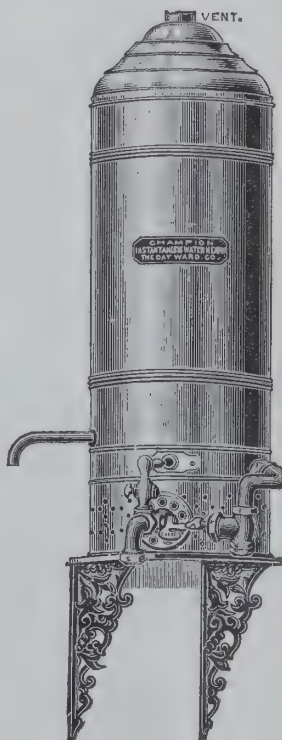
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## THE FUTURE OF AMERICAN SHIPPING.

THERE is every present indication that one of the most momentous results of the war with Spain will be the creation of a vast steel merchant marine in the shipyards of the United States with the resulting stimulus to a hundred branches of industry that such a movement implies. That this would be the exact reverse of what happened in consequence of the war between the States in 1860-1865 is a striking evidence of the industrial progress made by this country since that time. During the first half of the present century the American merchant marine was one of the finest in the world. Its vessels were admittedly among the fastest and the most beautiful afloat. That was the day of sailing-ships and the American "clipper" type was equalled by few, surpassed by none. In steam vessels we held our own. All, however, were of wood, as were the vessels of all other nations. It was not the perils of war alone that swept this fine merchant marine from the seas. Steam took the place of sail more and more as time went on and iron and later steel took the place of wood. These changes introduced an element into the shipbuilding industry that weakened and for a time nearly destroyed American competition. The superiority of Great Britain in all that pertained to iron and steel was overwhelming. A law of Congress forbidding American registry to a foreign-built ship prevented the purchase of vessels built abroad, and the high cost of production prevented any great number being built at home except for the lake and coastwise trade which were confined by another law of Congress to vessels of American registry.

These causes sufficiently account for the situation as it existed at the beginning of the present war. Of a total sea-going foreign commerce of \$1,714,829,043, only \$188,575,277 were carried under the American flag, or about 11 per cent. The action of the

Government has tended to still further increase this already vast disparity. Not less than 100,000 tons of shipping, all of it iron and steel with steam as the motive power, have been purchased by the Government for auxiliary cruisers, harbor patrols, freighters, transports, hospital ships, water and refrigerator vessels, and so on. These vessels have been selected with great care notwithstanding the immediate occasion for their use and most of them will probably remain in the Government service. Besides this considerable aggregate a still larger tonnage has been leased for war purposes and will be withdrawn from peaceful pursuits for some time. These vessels have been of American registry as far as possible. The significance of these figures with respect to the future of American shipbuilding can be appreciated when we state that the total iron and steel steam tonnage built upon the Atlantic and Gulf coasts of the United States in 1897 amounted to only 21,586 tons. To replace the vessels taken by the Government from the merchant marine during the past two months would require four times as large an output as was produced in all the Eastern shipyards during an entire year.

At first sight it might seem as though this was anything but a satisfactory situation and that the effect of the present war was destined to resemble that of the war of 1860-5 in still further reducing the American merchant marine. One great and all-important fact prevents this assumption and reverses the situation. We refer to the phenomenal fall in the American cost of producing iron and steel pointed out in our last number. To-day, for the first time in the history of American industry, all the materials for a modern steel steamship can be produced in the United States as cheaply, and in many cases far more cheaply, than anywhere else in the world. Iron ore (Bessemer), for example, costs 11s. 6d. per long ton for 63 per cent. grade at Pittsburg as against 14s. 9d. for 50 per cent. at Middlesborough. Coke costs at Connellsville 6s. 6d., as against 13s. 6d. at Durham. Steel ship plates cost £4 12s. in Pittsburg against £5 10s. at Middlesborough, and so on.

It needed just such an incentive as this little war to precipitate, so to speak, this great latent advantage into the tangible form of shipyards. Figures demonstrated that it was possible to construct modern steam vessels on the Delaware and the Hudson as cheaply and as well as could be done upon the Clyde, the Tyne or the Thames certainly six months ago. But for the war it would have taken six years for capital to flow in the direction indicated in any considerable amounts. As it is, not only has the smallness of our merchant marine been "shown up" in the most glaring manner, but the ability of our shipbuilders to do first-class work has been demonstrated. The tests of the new American-built American navy have been severe, some of them unparalleled, but it has met every condition brilliantly.

That the lesson has not been lost upon the Government the action of Congress in vastly increasing its naval appropriations shows. This in itself will insure a measurable degree of stability to the shipbuilding industry in its impending rapid expansion. It is well known that the huge orders of the English Admiralty have for many years acted as a sort of immense fly-wheel in the industrial operations of the great English shipyards. Aggregating vast sums, and placed years in advance, they in themselves justified a largeness of equipment and preparation that enabled English steamship builders to meet any demands both for foreign navies and for the merchant marine. The same effect, on a much smaller scale, will be produced by the new naval policy of this Government.

What this Government has already done is sufficiently remarkable. Fifteen years ago our flag was not flying on a single modern ship of war. We could not make a ton of armor in this country. The progress since that time was succinctly stated by the Chairman of the Committee on Naval Affairs in a recent speech in the House of Representatives on the Naval Appropriation Bill.

"During that time [fifteen years] we have increased the authorization of vessels of the new navy, including those in the present bill, by 258,014 tons.

"The appropriations for the increase of the navy during that period, including the present bill, have been \$151,117,597.

"The increase of the naval force of enlisted men during the fifteen years has been 5,500 men.

"When we come to the increase of the armament of the navy in fifteen



years, starting from a condition where we had not a single modern gun afloat, we have put afloat and authorized, including the provisions of this present bill, a navy capable of throwing at every full discharge of its guns 122,260 pounds of metal.

"The number of ships shows a similar proportion. We have built in fifteen years' time 114 vessels of all classes.

"Of torpedo boats and destroyers there have been sixty-three authorized."

That this nation will ever enter upon such an extensive naval programme as that so ably and steadily carried out by Great Britain is wholly improbable. But the size and scope of the Naval Appropriation Bill recently passed indicate the amount of Government work that American shipbuilding firms will have to depend upon, not only under the terms of this bill but probably for many years to come.

Congress has fixed the appropriation at \$57,000,000—more than double the appropriation for the current year, which had been the largest since we began the construction of our modern navy. It authorizes the construction of three new sea-going battle-ships, each of 11,000 tons displacement, carrying the heaviest armor and most powerful armament, to cost, exclusive of armor and armament, \$3,000,000 each; four coast-defense monitors, to cost \$1,250,000 each; sixteen torpedo-boat destroyers, and twelve torpedo-boats, to cost \$6,900,000, and one gunboat for the Great Lakes, to cost \$260,000. It also authorizes the construction of drydocks to cost \$850,000 each; at Portsmouth, Boston, League Island and Mare Island, and a steel floating dock at Algiers, La.

In all that pertains to industrial development the Americans are wonder workers. Great industries spring up here as though by magic. Frequently capitalists hesitate almost unduly before embarking upon a new and untried line of industry, but when they finally do embark they go at it with enormous energy, surmount every obstacle with resolution and boldness, and bring all their resources to bear upon the successful achievement of their aims. So will it be with steel shipbuilding. Capital in this country has seemingly avoided the sea for many years past, probably because the returns from investments upon land and in land enterprises were quicker and larger. This is no longer the case, and we expect to see an amount of capital devoted to the building of iron and steel ships for both naval and mercantile marines, and a creation of shipbuilding plants in this country that will be almost startling to those who are not accustomed to the rapidity of American industrial development. What foreign governments think of our present ability is shown in the two Japanese cruisers of 4,900 tons each now building, one at an Atlantic, the other at a Pacific shipyard, and the recent order given by the Russian Government for a 12,500-ton battle-ship, a 6,100-ton cruiser and ten first-class torpedo boats, to cost \$15,000,000 altogether, of a well-known American firm. There is every indication that we are now witnessing the beginnings of what is destined to become a vast industry whose beneficial influence will stimulate industry along a thousand lines besides restoring to America her former prestige upon the sea and giving to the great commercial nations of the world a new and highly favorable market in which to buy their ships.

## HOW AMERICAN EXPORTS ARE CARRIED IN TIME OF WAR.

THREE months ago we pointed out in these columns that the effect of a foreign war upon the export trade of the United States must necessarily be slight, inasmuch as the greater part of our exports are normally carried in foreign bottoms and hence would be exposed to no danger more serious than a little delay. This view has been abundantly verified by the actual course of events. Our exports for the month of March, when the Cuban crisis became acute and the outbreak of actual hostilities imminent, exceeded those of March, 1897, by no less than \$25,392,842. Our exports for April, during which month war was actually declared, exceeded those of the April last preceding by \$22,027,265. The significance of these impressive figures can be the better realized when it is added that 1897 was the banner year of the American

export trade. The grand total of the exports for March, \$110,812,883, has, we believe, never been surpassed by the exports for a single month in the history of the United States.

This indicates that American exports are not in the way of immediate annihilation. But in order the more correctly to estimate the situation it will be worth while to study the reports of the Bureau of Statistics on the carrying trade of the United States showing the flags under which these exports actually sailed.

### DISTRIBUTION, BY FLAG OF CARRYING VESSEL, OF THE VALUE OF EXPORTS OF MERCHANDISE.

	BY HOME PORTS.				Total.
	Atlantic ports.	Gulf ports.	Pacific ports.	Northern border and lake ports.	
Cars and other land vehicles....	334,603	1,082,860	202,485	4,333,788	5,953,736
American vessels.....	3,319,885	339,635	1,221,558	82,273	4,963,351
FOREIGN VESSELS.					
Belgian.....	1,643,639	.....	.....	.....	1,643,639
British.....	56,075,421	16,115,573	3,687,003	10,931	75,888,928
Dutch.....	1,968,866	256,801	.....	.....	2,225,667
French.....	1,108,548	.....	176,941	.....	1,285,489
German.....	7,628,953	1,199,530	170,909	.....	8,999,392
Italian.....	179,484	88,747	.....	.....	268,231
Norwegian.....	3,034,576	652,612	12,438	.....	3,699,626
All other.....	2,087,881	3,090,522	706,421	.....	5,884,824
Total.....	73,727,368	21,403,785	4,753,712	10,931	99,898,796
Total value of merchandise.....	77,381,856	22,826,280	6,177,755	4,426,992	110,812,883

From the foregoing it appears that the valuation of our exports at present carried in American bottoms is only 4.4 per cent. of the whole. It is also apparent that one very large item, the exports from Pacific ports, is exposed to no danger. A study of the table following regarding the country of destination of the shipments made under these various flags will indicate still more exactly the real situation.

### DISTRIBUTION, BY FLAG OF CARRYING VESSEL, OF THE VALUE OF EXPORTS OF MERCHANDISE.

	BY COUNTRIES.						Total.
	Europe.	North America.	South America.	Asia.	Oceanica.	Africa.	
Cars and other land vehicles.....	240,091	5,506,010	.....	109,672	97,963	.....	5,953,736
American vessels..	866,877	2,674,419	642,672	364,032	349,748	65,603	4,963,351
FOREIGN VESSELS.							
Belgian.....	1,464,466	.....	151,208	.....	3,412	24,553	1,643,639
British.....	66,664,740	1,602,022	1,660,003	3,593,881	1,053,291	1,315,491	75,888,928
Dutch.....	2,121,100	52,674	47,973	3,920	.....	.....	2,225,667
French.....	1,129,811	38,137	8,436	.....	.....	109,105	1,285,489
German.....	8,583,175	45,39	192,183	29,844	51,919	96,632	8,999,392
Italian.....	176,344	3,383	26,234	36,122	.....	26,148	268,231
Norwegian.....	3,114,668	417,932	167,026	.....	.....	.....	3,699,626
All other.....	4,964,832	162,239	24,580	584,341	115,349	33,483	5,884,824
Total.....	88,219,136	2,322,026	2,277,043	4,247,608	1,223,971	1,605,412	99,898,796
Total value of merchandise.....	89,326,104	10,502,455	2,920,315	4,721,312	1,671,682	1,671,015	110,812,883

The first point to be remarked in connection with this statement is the overwhelming preponderance of exports to North American countries among those carried in American bottoms. \$2,674,419, or over one-half of the total amount carried under the American flag went to these countries. This commerce, excepting that with the West Indies, is in no danger, and is not likely to be. The exports to Europe carried under the American flag were confined to two countries, France and the United Kingdom. The entire volume of our exports to every other country in Europe was carried under foreign flags. Of these two France received \$14,814 in American vessels as against \$5,543,879 in foreign, while Great Britain received \$852,063 in American vessels as against \$49,846,591 in foreign, her own for the most part. The exports to Asia and Oceanica are safe as a result of the battle of Manila. The trade with South America and that with the West Indies, referred to above, unquestionably runs some risk since it must pass so close to the seat of war. But the preponderance of American naval power in those waters renders the danger slight and it has yet to be announced that an American ship has been captured.

Altogether this investigation is very satisfactory. "It is better to know than to think." Danger should be neither exaggerated nor minimized. The real situation, as faithfully indicated by these figures, should have no terrors for anybody.



### THE VOYAGE OF THE OREGON.

MODERN warfare has an industrial aspect, the importance of which cannot be overlooked. Success in nineteenth-century naval operations requires intelligence and skill in the handling of machinery, and presupposes those qualities in its construction, as well as a genius for naval strategy and tactics. From this point of view the recent achievement of the U. S. battleship *Oregon* was almost as remarkable as the battle of Manila. Our readers will remember that this vessel—a first-class sea-going battleship of 10,288 tons displacement, 9,000 horse-power and credited with a speed capacity of 15 knots an hour—was ordered from Puget Sound on the Pacific coast of the United States to the Atlantic Ocean in order to make her great offensive and defensive power available in the present war. She left Bremerton, Puget Sound, where she had been in dry dock, March 6th, and reached San Francisco three days later. Here she coaled and lay awaiting orders until March 19th, when she set sail on her long voyage. She ran without stop to Callao, Peru, a distance of 4,500 knots, arriving April 4th. This run was made at a speed of 11 knots an hour in order to economize on fuel. After recoaling, the *Oregon* set out again, April 7th, and, running against head winds and in severe storms, reached the Straits of Magellan April 16th. The last ten hours of her run before reaching Punta Arenas she made 155 knots, 15 1-2 knots an hour. April 21st she left, having recoaled, and reached Rio Janeiro April 30th. Here more coal was taken on, and her consorts were left behind. She left Rio Janeiro May 4th, and arrived at Key West Harbor at 7 o'clock May 27th. Four of the records made on this voyage are remarkable for a battleship. First, the total length of the trip for a single voyage, 17,499 miles in all. A continuous run of 4,500 knots, and a continuous run of 2,484 knots at an average speed of 13 1-2 knots are also notable, as was the short run of 155 knots at the high speed mentioned above. Not less notable than any or all of these was the fact that the great ship steamed in from her long voyage with her engines as fit and all her machinery as ready for instant action as when she started. This is a great tribute both to the ability of her officers and crew and of her builders. We understand that the Russian Government has already taken official notice of the feat by telegraphing its congratulations to the builders, the Union Iron Works of San Francisco, and that their representative is on his way to St. Petersburg. Other naval powers are likely to follow this enlightened example. There are many governments that are drawn by motives both of interest and sentiment to prefer the United States in awarding contracts of this kind. But, in business so vital as the construction of a warship, the supreme consideration must always be the quality of the product itself. The battle of Manila and this noteworthy voyage of the *Oregon* are the two greatest tests the war has yet produced, and both are eminently satisfactory. The former shows what we can do in the way of making excellent guns and of handling them excellently, and the latter is a demonstration of the merits of our engines and our ships.

### THE PARIS EXPOSITION IN 1900.

ON the 15th of April of the year that marks the close of the greatest century in the history of human progress and the beginning of a century that promises to be yet more notable, there will be opened in Paris a great international exposition, designed to display the progress of the past and the possibilities of the future in a manner worthy of so momentous an event. Without doubt this exposition will surpass all its predecessors wherever held just as they have, each in turn, surpassed all previous achievements of this nature.

It is, accordingly, a matter of satisfaction that the United States is to be adequately represented at Paris in 1900. Although somewhat later than many of her sister nations, this country formally accepted the invitation of the Republic of France to participate in this exposition in an act of Congress, passed July 9, 1897,

and a very able and energetic special commissioner was appointed by the President in the person of the late Major Moses P. Handy. By the untiring efforts of this commissioner, made effective through the courtesy and consideration of the directors of the exposition, an amount of space was secured for the exhibits of this country commensurate with its dignity and importance, and satisfactorily proportionate to that granted to the other great commercial and industrial nations. In an act now pending in Congress, and likely to be passed at any time, \$750,000 are appropriated, in addition to a previous appropriation of \$25,000 for the expenses of the special commissioner, to defray the necessary expenses incident to a worthy and efficient representation of the arts, manufactures and general progress of the United States.

In connection with this appropriation it is worthy of note, in passing, that the hostile attitude of a portion of the French press toward the United States in its present war with Spain has been estimated at its true importance by our public men and ignored altogether. Americans who have lived in France and mingled with all classes of the French people are agreed that at bottom they are as well disposed toward us as we toward them. It is, of course, perfectly natural that the supporters of the French military and naval systems should decry and ridicule a system exactly the opposite of their own. Very likely the friends of both the American idea of a small and highly efficient army and navy backed by a large militia and the European effort to have the largest possible armament on both land and sea will receive several surprises and disillusionments during the present war. But this difference is not a matter to quarrel over, and on the great questions of religious and political freedom, of form of government, of popular education, of art and letters, and every other that affects two people as individuals, the two great republics are one in sympathies, and will so remain.

As between France and the United States the coming exposition only emphasizes this great community of interests. But it will have a still more far-reaching influence and significance. There is no form of enterprise that makes more strongly for international good will and mutual respect and friendship than these great expositions. At the present moment, when international trade is disturbed by occasional rumors that the small conflict now going on between the United States and Spain may expand into a conflagration of war embracing every civilized power from Cape Finisterre to Japan, it is especially satisfactory to note that the preparations for the great friendly rivalry of 1900 are going on uninterruptedly on every hand. In itself this is no inconsiderable guarantee of peace. Nations that are preparing to cut each other's throats do not at the same time prepare to instruct and amuse one another and encourage buying and selling in a great world's fair.

On another page we publish some matter of interest regarding the participation of the United States in the proposed exposition at Paris, and something about the plans of our French friends. That they will prove as skillful and courteous hosts as ever we do not doubt. We, for our part, will strive to make our participation in the great event both honorable to ourselves and helpful to others.

### THE ELECTRIC RAILWAY REVOLUTION.

THE history of electric traction in the United States presents a striking illustration of the promptness with which American capital will take up and the American people patronize a useful invention. It is but a little over ten years since the first electric railway was successfully inaugurated in the United States. Now, according to the latest available statistics—which are already several months out of date—there are 953 electric railways in this country operating, 13,765 miles of track and with capital invested aggregating \$846,131,691. In the year 1897 alone the mileage operated by electricity increased 1,632 miles, while that operated by cable decreased 60, by horse power 272, and by miscellaneous systems 52 miles. At present over 90 per cent. of the street railways of the country employ electricity as their motive power.

These figures, however, impressive though they are, convey a very inadequate conception of the meaning and importance of the



change that has taken place. That experience has shown that electric roads can be operated much more cheaply than those employing any other form of power goes without saying, since otherwise there would have been no such universal adoption of the system. But the progress has manifested itself in other directions. Each year has seen larger and more comfortable cars taken as the type until now the modern electric car is a veritable parlor on wheels compared with the rattling, jolting and unsanitary horse cars of ten years ago. The modern car is heated by electricity in winter, is well ventilated at all times, is substantially, often richly, upholstered, handsomely decorated, well lighted, dustproof, as nearly noiseless as any system yet devised can make it, and runs smoothly and swiftly. As to the last quality—speed—no limit is yet apparent, although unquestionably each line has a maximum of its own beyond which further advance would be perilous. But the successful tests on an Ohio road, resulting in a trial speed of eighty-six miles an hour, and a normal speed continued for months without accident of over forty miles an hour on the same road, show that the danger limit is sufficiently remote for all practical purposes.

Coupled with all this progress in equipment and operation are attendant advantages wholly unconnected with the management of the road. The horse-car lines rarely were laid in any but the most important streets and stopped, usually, long before the outskirts of the city were reached. Their electric successors not only form a network bringing cars regularly to within a moment's walk of every door in the city, but extend far out into the country to all the towns and villages lying within a radius of ten and even twenty miles. Lines are now in successful operation all over the country that do not reach any large city whatever, but connect groups of country villages. It is possible in thickly inhabited districts, like the State of Massachusetts for example, to ride all day in one direction on successive country electric railroads, spinning up hill and down dale most delightfully, and return on the morrow to the point of starting without once using again the lines travelled the day before. In Massachusetts alone there are 1,153 miles of electric railway, in Pennsylvania 1,491, New York 1,904, while Ohio has 1,135, and Illinois 1,060.

It requires but a moment's reflection to perceive some of the results of this great expansion of electric railway service. The suburbs of a city are, as it were, pushed back into the surrounding country so that it is possible for people to work each day in the noisy, dusty city, and yet retire for their night's rest to a home amid entirely country surroundings, healthy, beautiful and still. It is possible for thousands and hundreds of thousands of city toilers, even the poorest, for the rates of fare are uniformly five cents, to go with their families to spend a holiday by the seashore, or near some distant lake or woodland. The lines from village to village and from village to city, serve to draw the whole community closer together. The country people can come to attend city lectures or sermons, visit city museums, or shop in the great city stores. An increasing number of these roads now carry not only the mails, but express and even freight, thus bringing country produce into the city almost with the dew upon it, and enabling the occupants of distant farmhouses to have the varied products of civilization delivered literally at their very doors.

Thus far Europe has been somewhat slow to adopt this great invention, with the numerous advantages, material and social, that it carries in its train. There are substantial reasons for this delay, but we feel confident that the near future will see a great and general adoption of electricity as a motive power throughout Europe, as well as all over the world. One reason for the slowness of European capitalists to undertake the construction and operation of such roads is doubtless the conservatism that hesitates naturally until a new system has been thoroughly tested before embarking in it. Another is that the roads in the countries in the north of Europe are excellent, and hence the need of electric railways is less felt than in America or other new countries where the roads at first are necessarily poor. Another reason is doubtless the hostility of the steam roads and existing omnibus lines and other powerful vested

interests; but this also operated in America, but not, as can be seen, very effectively. Class distinctions may also militate to some extent against so democratic an institution as the electric railway, where rich and poor must jostle one another without distinction.

All Europe, according to the latest available statistics, some of which are very recent, possesses only about as great an electric mileage as the single State of New York. Germany is greatly in the lead, with 843 miles, that country having 66 roads operating electrically, with 30 more building or contemplated. France has 24 electric roads, Belgium a still smaller number, although at least one, that of Brussels, has attained a high degree of excellence. Great Britain has some 15 lines now in operation, aggregating some 100 miles of track, but it is worthy of notice that a single line now being equipped with a modern American system, that of Glasgow, will nearly double this showing. Dublin, Edinburgh and other important centres have electric lines either completed or in process of completion, so the position of Great Britain is being rapidly advanced. Altogether, the outlook is very favorable to a large increase of the electric mileage of Europe during the next decade, and it is pleasant to note that a large number of the lines now in process of construction are American-built, while a still larger number employ American systems and American machinery. Besides the London underground railway already referred to in these columns and the street railway system of Glasgow mentioned above, American electrical engineering has been practically adopted for street-car systems in Dublin, Edinburgh, Cork, Bristol, Coventry, Paris, Berlin, Hamburg, Brussels, Aix la Chapelle, Dresden, Vienna, Budapest and a great number of other places, many of them large and important.

#### ADVERTISED BY OUR RIVALS OVER THE SEA.

STUDENTS of the history of international trade are agreed that one of the most unwise laws ever passed was the Merchandise Stamp Act passed by the English Parliament requiring all goods made in the German empire to be stamped "Made in Germany." German manufactures were regarded as, on the whole, poor stuff, and it was thought that in time "Made in Germany" would be the accepted popular equivalent of "shoddy" and "cheap and nasty." But the effect was wholly different. Not only did the importation of German manufactures continue to increase, but the brand revealed to a vast number of buyers of unbranded or rebranded goods the previously unsuspected fact that these goods were made in Germany and led them to decide to transact their business direct, to the consequent destruction of a large and profitable middleman's business that had been growing up in England in these goods.

The lesson of this experience was so obvious that it is to say the least surprising to find that it has apparently been wholly lost upon its principal beneficiary. We are informed that Germany is now proposing to play the rôle taken by England in the preceding instance and give America the benefit of all the free advertising—at government expense—that a zealous officialdom can invent. One recent instance is the proposal to permit American horses to be landed in Germany only after they have been marked with an indelible brand as "American." The same spirit prompted the official attacks upon American fresh and dried fruit, American pork, canned meats, and so on through a long chapter.

The theory of German Agrarians—for that influential class doubtless inspired all these attacks—was apparently identical with that of the English manufacturer who proposed the Stamp Act. Each reasoned that it was only necessary to give the goods in question a bad name and trade in them would die of itself. And so it would had the name been deserved. The people themselves can quickly decide whether certain canned meats are or are not poisonous or a given breed of horses satisfactory or undesirable. Official clamor on the subject can only serve to emphasize anew the country of their origin and awaken popular interest in the products about which so much is said. The native apples of Germany, for example, are nearly, if not quite, the worst in the world. They are knotty and



tasteless and small, as the present writer has repeatedly observed from personal experience. American apples are shipped across the Atlantic and offered to the German housewife at lower prices than prevail in America itself. No amount of learned investigation and inspection will fool the housewife as to which are the better apples.

The Germans themselves are not deceived as to the animus of these attacks. The *Frankfurter Zeitung*, commenting upon the recent decree, expresses the general sentiment as follows:

With all due respect to the efforts which are being made by every branch of German agriculturists to protect themselves from the invasion of various enemies, one cannot escape the conviction that the American tree louse is now playing the same rôle that the American trichina played for so long a time, and it is hoped, by means of this trick, to ward off and exclude another important foreign competition to German agriculture. During the recent agrarian debates in the Reichstag, some complaint was heard against the tree louse, and the Government then announced that it was considering measures to avert the danger. It seems to have adopted the radical remedy of a prohibitory decree. The conditions of commercial politics in America will not be improved by such means.

In a similar spirit the *Leipsic Tageblatt* refers to "the foolish action of the German Agricultural Bund, which has inspired the unheard-of measures against the importation to this country of American agricultural products, and has had the audacity to condemn American meats as unwholesome, thereby greatly imbitting the feelings of American farmers against Germany."

At present Germany from her position on the seaboard acts as middleman for vast quantities of American goods that are shipped to interior points in other countries, and she also enjoys the revenues that result from this large carrying trade. All this her present policy is in a fair way to sacrifice. Meanwhile, it is impossible that any governmental policy should long succeed in forcing people to eat bad apples when they have learned where good ones are to had, or can permanently make necessities of life dear. The manufacturing and commercial classes of Germany will protest against being taxed to support the agrarian, however loudly the latter may shout that all protest is "unpatriotic."

### EXPORT STATISTICS.

WE present to the attention of our readers with this issue of THE AMERICAN EXPORTER a number of statistical tables showing the exports of the United States along several interesting and important lines. Facts, not theories, are what those who are interested in the condition of our export trade want to have. Particularly at this time is it worth while to consider the realities of the situation rather than the blood-curdling fancies of space writers in penny-dreadfuls. We trust that the facts about American export trade as we present them are sufficiently substantial to satisfy the most exacting and sufficiently satisfactory to reassure the most pessimistic.

A few people, on both sides of the Atlantic, appear to have become possessed of a notion that this little war with Spain is going somehow to work the very mischief with American export trade. Undoubtedly manufacturers in other countries hope that this will prove to be the case, and the wish may be the father to the thought. The real facts, showing as they do that our exports were never so large as now and the general outlook never so hopeful, should dispose of this notion so effectually that we shall never hear of it again. We have already shown in these columns why a foreign war is not likely to disturb our foreign trade. It only remained to show, which these figures do, that it has not disturbed it.

At the beginning of the war the novelty of the situation naturally caused a good deal of aimless speculation as to what would happen if this or that remote contingency should eventuate. "Yellow" journalism, also a novelty on both sides of the Atlantic, intensified the feelings of hesitation, and in some instances of alarm, by its constant clamor, in poster type, about all sorts of terrors and complications. But business men quickly discovered that the world was running along much as usual after all, eating and drinking and wearing clothes, buying and selling and attending to its business

generally, and concluded that unless they wished to sacrifice their business connections they must quit reading "extras" and devote themselves once more to their own affairs. In domestic trade the momentary interruption of trade was sufficiently large to be perceptible. Our foreign trade does not appear from the returns to have suffered any interruption at all, owing no doubt to the fact that those local conditions which might tend to lessen demand over here had no effect abroad. This is the chief significance of the statistics presented in this issue. They are to be found in the various departments under which the articles discussed belong, and we particularly call the reader's attention to them. They will repay careful study.

IN our last issue we had something to say about the terrible Spanish privateers that the yellow journals assured us were about to swoop down like Captain Kidd and Billy Bones of immortal memory and scare our commerce from the seas. Up to the time of going to press nothing has been heard of any actual capture made by these redoubtable legalized buccaneers, but meanwhile our mouths are kept wide open and our hair on end by the most alarming reports of "heavy firing off the New England coast." One naval officer on duty off Havana—the war being a trifle quiet down there and time hanging heavy on his hands—has been cutting out these reports as they appear and pasting them in a scrap-book, and he is authority for the statement that during the first thirty-eight days of the war there has been "heavy firing off the New England coast" for twenty-six days and nights, and no less than sixteen shipmasters have had the chase of their lives by strange goblin craft which pursue them in the night time and are never heard of by day. It is said that the first greeting whenever a despatch boat reaches the fleet in Cuban waters from Key West is an inquiry for the latest war news from the New England coast.

THE recent remarkable trip of the U. S. Battleship *Oregon* emphasizes anew and in a most striking manner the importance and value of an interoceanic canal at the Isthmus of Panama or to the north of there. American engineers have reported more than once that the Nicaragua route is both practicable and reasonably inexpensive and that it offers marked points of superiority over any other route. Without discussing the arguments *pro* and *con* at this time it is at least apparent that the saving of 10,000 miles in the *Oregon's* recent 17,000-mile trip would have been of vast importance to the American Government. Commercially the saving would be of transcendent value to the entire business world. The trip from Liverpool to San Francisco would be shortened 8,783 miles, that to Melbourne 14,449. The trip from New York to San Francisco would be shortened 5,651 miles, to Melbourne 11,357, and so on. It is not generally known that a vessel sailing around South America, say from west to east, as did the *Oregon*, not only loses by going south and then retracing its course north again, but goes 2,400 miles to the east to round Cape Horn or to pass the Straits of Magellan and then 2,400 miles westward from off Cape St. Roque, Brazil.

THE first commercial agreement under section 3 of the Dingley tariff law, the "reciprocity clause," as our readers will remember, has just been concluded and announced by Presidential proclamation, the terms of the agreement having gone into effect June 1. It was between the government of the United States and that of France, and its conclusion at the present time may therefore be regarded as another evidence of the friendliness between the two nations. On another page we publish a resumé of the principal items covered by the proclamation. It must be confessed that the results gained are rather small considering the fact that negotiations have been going on since last October on the subject. However, every concession is a step in the right direction, and there is reason to believe that reciprocity treaties between this country and several of the other important commercial nations are already well advanced and will add their stimulating influence to our foreign trade in a very short time.



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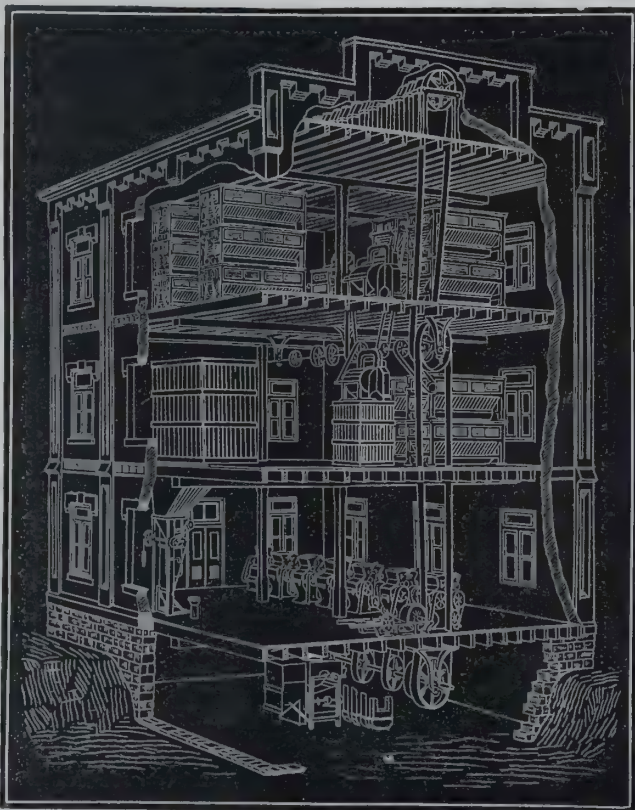
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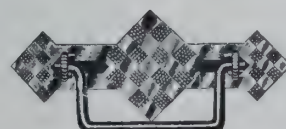
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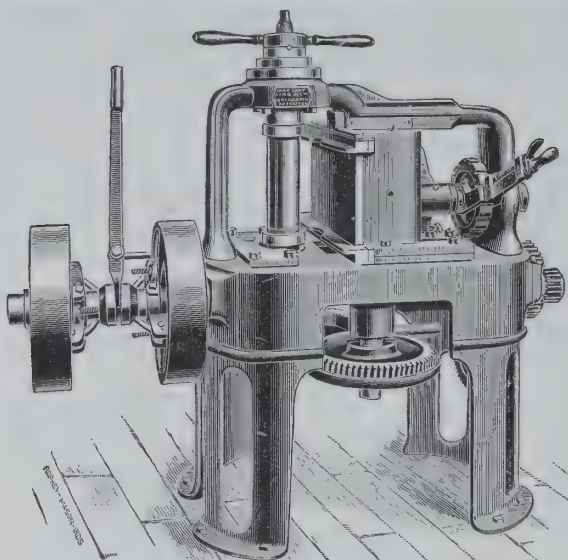


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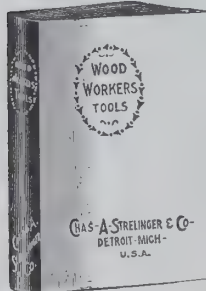
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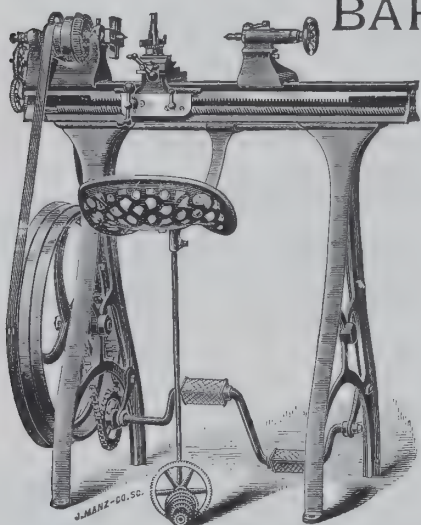
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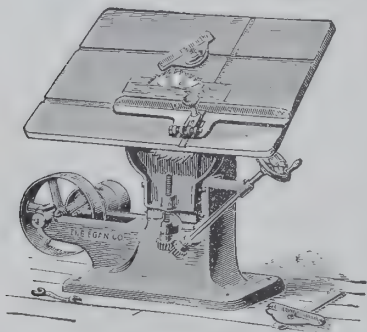
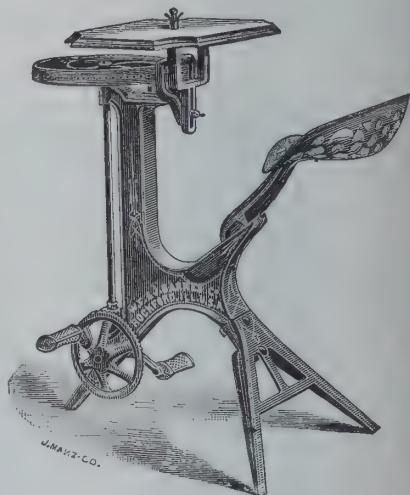
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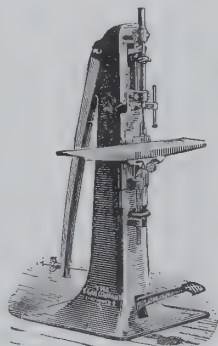
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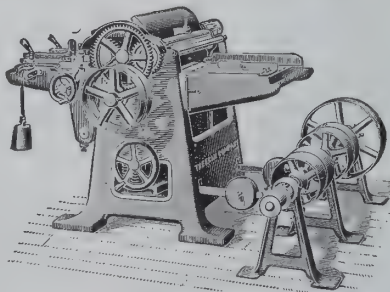
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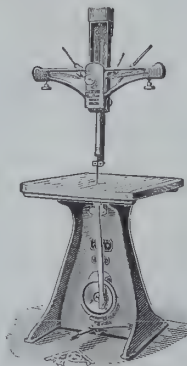
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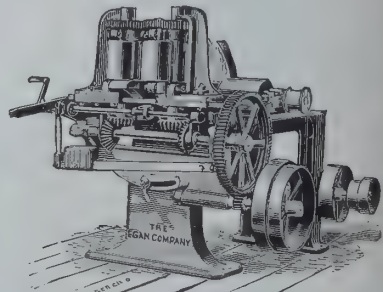
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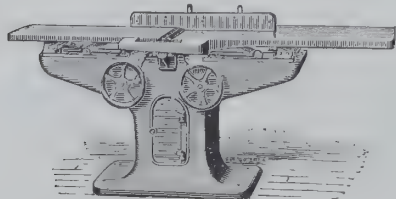
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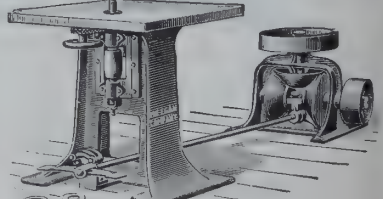
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## SOME NEW STATISTICS REGARDING OUR EXPORTS OF MACHINERY.

ONE of the most reliable signs of the expansion of our foreign trade in machinery is the fact that hardly a year passes but that the Bureau of Statistics finds it necessary to compile figures bearing upon some new line that had previously been hidden under the general catch-all of "other machinery." To those who read the records of this valuable department with attention the little bracketed (a) with the accompanying foot note "Not stated separately prior to —," is as pregnant with meaning as any figures. It means that prior to the date given the exports of this article were regarded by the Government statisticians as too small to be worthy of separate enumeration, while since that date they have been too large to be any longer ignored.

July, 1897, saw a larger number of items added to the list of articles regarding which the export figures are tabulated separately than ever before. Under manufactures of iron and steel alone the following were separately tabulated for the first time last July. Billets, ingots and blooms; rods, wire of steel; structural iron and steel; electrical machinery; metal working machinery; pumps and pumping machinery; shoe machinery; pipes and fittings; safes; while typewriters were tabulated by countries of destination for the first time. With the exception of typewriting machines, discussed elsewhere in this paper, and billets, ingots and blooms, together with rods and steel wire, the figures concerning which will be of little interest to most of our readers, we reproduce these interesting statistics in full:

EXPORTS OF SPECIAL MACHINERY AND OTHER MANUFACTURES OF IRON AND STEEL

	Electrical Machinery.	Metalwork- ing Machinery.	Pumps and Pumping Machinery.	Shoe Machinery.	Pipes and Fittings.	Safes.	Structural Iron and Steel.
July .....	\$64,839	\$267,286	\$159,828	\$54,020	\$225,000	\$8,048	\$37,888
August .....	178,713	314,600	191,091	52,866	190,063	7,520	126,620
September .....	129,567	308,838	151,117	57,433	147,990	6,107	106,270
October .....	116,794	337,792	135,804	103,283	162,146	7,888	142,844
November .....	171,668	360,329	138,044	55,732	210,429	9,534	110,554
December .....	255,872	452,043	178,400	81,918	36,624	7,012	80,610
January .....	172,791	394,979	162,628	89,311	221,951	4,648	77,286
February .....	183,676	425,233	160,088	68,514	280,178	3,222	83,965
March .....	243,378	451,855	229,438	77,661	302,150	9,192	120,289
Total, 9 mos. .	\$1,517,498	\$3,312,960	\$1,507,388	\$640,738	\$2,051,531	\$63,581	\$885,579

Several points of interest appear in the foregoing figures. At the outset the reader will notice that there is on the whole a steady tendency to increase from month to month in spite of occasional and altogether natural fluctuations. For example of the five largest monthly returns for metalworking machinery all five, while for electrical, pumping and shoe machinery and pipes and fittings as well, four out of the five fell during the last five months. It is worth noting in the same connection that the returns for March surpassed all predecessors in the case of pumping machinery, while they ran a close second in the case of electrical, metalworking and shoe machinery, pipes and fittings and safes. This straw does not indicate that the war is affecting our exports in these important lines much.

The returns on the various machinery items speak for themselves and bear out what we have so often asserted in our editorial columns, that the world is sure to turn more and more toward the United States for its supplies of labor-saving machinery. The exports of safes are at present insignificant in amount, but we expect to see a rapid increase in the near future. Safes are preëminently articles requiring great ingenuity in their design and great skill and delicacy in their workmanship. The recent fires at London and Melbourne demonstrated the fact that the safes now in use in a surprisingly large proportion of foreign offices are either old or faulty in design or construction and cannot be depended upon to do the work for which they are intended. Without claiming any extraordinary superiority on the part of American made safes over those of the best modern makes elsewhere we believe that they will rapidly win an important place in foreign estimation as soon as they are properly presented and pushed. The fall in the price of American made iron and steel accounts for the exports of structural iron and steel, five years ago impossible. The same cause will enable exporters of this class of manufactures to increase their sales far beyond their present creditable figure.

## The Bessemer vs. the Open-Hearth Process in the United States.

THE development of the basic process, both Bessemer and open hearth, has only quite lately become general in this country, notwithstanding its very wide introduction in Europe more than ten years ago. The reasons for this slower development are manifold. In the first place, the mechanical genius early developed by many American engineers at the head of the Bessemer works in this country rapidly brought the Bessemer process to such a state of metallurgical perfection and economy of production as to make it seem unwise to those having capital to invest to introduce a rival process in which the cost of production was at that time necessarily much higher. A second reason was probably the natural reluctance of the enormous capital already invested in Bessemer plants, under the protection of the Bessemer patents, to branch out into other developments, which were, on the one hand, not so well protected by ground patents as was the Bessemer process, and the resulting product of which, on the other hand, would, by its more uniform character, rapidly replace the Bessemer product. A third very apparent reason appears to have been the fact that in America it has not been the exception, but rather the rule, to find our largest iron ore deposits adaptable to the Bessemer process, whereas England, Belgium and Germany have had to depend to a very great extent on the importation of foreign ores, sufficiently high in iron and low in phosphorus to act as corrective admixture for their own high phosphorus ores, if any of the latter were to be used at all. At the present time, however, all these reasons have given way to the influence of improvements in the basic process, and present developments all seem to tend in the direction of the basic open-hearth.

## Floating Machine Shops.

REPAIR ships, it is said, will play a very important part in connection with the present war. For this kind of work the style of craft most suitable is a ship of 2,500 to 3,000 tons, with plenty of space between decks, so as to afford room for the apparatus of a small factory. She must also have large coal capacity in her bowels, so that she may be able to keep the sea for a long time. Besides the fuel is needed for distilling water, which is an incidental duty of the repair ship. Each one of these vessels will be a navigable repair shop of a most comprehensive description. It will be provided with heavy steam tools of the latest patterns for executing every imaginable kind of work in metal, and its equipment will include massive cranes for hoisting weighty things aboard. In its hold will be carried duplicates of pretty nearly every sort of article that goes to make up a modern warship, from a coil of boiler tubing to a patch of armor for mending a hole made by a projectile. The navy department intends that each one of our fleets shall be provided with a repair ship of this kind, whose business it will be to accompany the war vessels and to serve them on all necessary occasions as a sort of first aid to the injured. Such a floating machine shop, however, will be serviceable for a good deal beyond mere emergency work, though this is what is required of it chiefly, plugging shot holes, fixing up boiler tubes, mending engines, etc.

During an action a repair ship will avoid the thick of the fight, hanging on the skirts of it so as to be available in case her services are wanted at any moment. Suppose, for example, that one of the American ships becomes disabled by an accident to her steering gear and is thus rendered useless for fighting purposes. The repair vessel, unless the engagement is so hot as to render such a movement impracticable, will steam up and take the helpless ship in tow, pulling her away to a distance and out of reach of the enemy's fire. Though not herself a fighting craft, the floating machine shop will be provided with half a dozen good-sized rapid-fire guns, so as to be able to put up some sort of defense in case she is attacked.

The crew of each of our repair ships will consist wholly of mechanics, specially trained in the construction of marine engines, electrical apparatus, and other mechanism that goes to make up a fighting vessel. While merely voyaging and not otherwise occupied, they will know how to act as coal heavers and engine drivers. Whenever it may be desirable, they will be transferred temporarily to war ships that need repairs, going aboard with their portable tools and mending whatever is to be mended. On their own craft they will have forges for making forgings of all kinds and sizes. They will have a cupola for making small castings of iron and brass. Obviously, if the American vessels after an engagement can put themselves into shape for further fighting in quicker time than the Spaniards, they will have a great advantage. This will be a branch of the service in which the great mechanical aptitude of our people will serve us in good stead.



## IMPROVEMENTS IN AMERICAN IRON AND STEEL MANUFACTURE DURING THE LAST DECADE.

[From a Presidential address by E. Gybbon Spilsbury before the American Institute of Mining Engineers.]

PROBABLY no previous period of the same duration has produced in all branches of mining and metallurgy improvements so many and so various as have the last ten or twelve years. Not that they have brought forth any such startling and revolutionizing inventions as were those of Sir Henry Bessemer or Thomas and Gilchrist in the metallurgy of steel. There has been rather a continued series of improvements and economies in lines already laid out. These have resulted in enabling the miner and manufacturer so to increase his output and lessen his cost of production as to be able to meet prices and conditions of trade wholly unexpected and unprecedented.

Ten years ago it would have been considered an impossibility to produce Bessemer pig to sell at a profit below \$17 a ton and foundry pig at \$12 a ton was equally impossible. To-day the market price for the former is as low as \$11, while ordinary irons are selling in the South below \$6 a ton at furnace, and the producers are not actually losing money at these figures. I do not mean to say that the whole of this change has been brought about by improvements in mining and smelting. We must recognize that at least a portion of the saving is due to the discovery of enlarged sources of cheap ore supply. At the same time the improved methods employed in mining these large deposits have enabled the owners to place their ores on the market at figures which a few years before would have been considered impracticable. The introduction of the steam shovel for the mining of the enormous hematite deposits of the Southern States, and more recently of those of the Mesabi range in Minnesota; the application of electrical power for lighting, mining, concentration and transportation, and the many improvements introduced in the various systems of wire-rope haulage and transportation have all been the means of bringing down the cost of producing iron ore to figures undreamt of ten years ago.

The change in furnace practice has been no less radical and progressive. In localities where, twelve years ago, a production of 1,000 tons per week was considered far above the average, it is now deemed to be below a profitable producing basis, and the average may be taken as 2,500 tons per week, while some furnaces (those at Duquesne) are now reported as producing as much as 6,500 tons in the same time, and these furnaces are now aiming at a regular output of 1,000 tons per day. As already observed, this increased production has been made possible, not by the invention of any one individual, but rather by the industry and intelligence of the vast army of toilers in every branch connected with the industry. The call for increased heat in the air blast was met by improvements in the design and construction of the firebrick stoves. The higher pressure made necessary by the increased height of the modern stack, together with the growing use of larger percentages of fine hematite ores and concentrates in the charge, soon called forth the necessary improvements in the design and power of the blowing engines, while the danger of a too rapid cutting out of the furnace lining, due to the increased heat around the zone of fusion, has been provided against by improvements in the water jackets, which, from being merely a protection around the tuyeres, have developed into a protection of the whole furnace below the bosh line. At the Duquesne furnaces, again, they are now doubling the number of tuyeres (making sixteen in all), it having been found impossible to supply the requisite amount of air through one set. Moreover, the rapid driving of the modern furnace has necessitated the abandonment of the old methods of charging by hand barrows and the substitution of automatic hoisting and charging devices capable of handling from 1,700 to 3,000 tons of material per day.

While it would be impossible in a paper as general as this must necessarily be to specify the many inventions which have tended to all these advances in the metallurgy of iron there are one or two which deserve special mention, since they enable the further use of the iron produced with results heretofore unattainable. The first of these is the mixer, invented and patented by our late member, Captain William R. Jones, of Pittsburg, by means of which the products of one or more furnaces are tapped into a receiver and there so thoroughly agitated and mixed as to furnish an absolutely uniform metal for further treatment in the manufacture of steel. By allowing the fluid metal to remain a certain time in these mixers (as is the custom in this country), or by the further use of lime (as is the custom in some of the English works), the resulting metal is very thoroughly desulphurized and the time necessary for its conversion in succeeding processes is materially lessened.

Another improvement is the casting of the pig metal in chills instead of into sand direct, thus materially lessening the silicon in the remelted metal and furnishing a material specially adapted to the basic open-hearth process.

A third improvement, while it has not yet come into such very general use, is, I imagine, destined to play a very prominent part in the steel industry of our Southern States. I allude to the desiliconizing process invented by Benjamin Talbot. This process consists in pouring the metal as it is tapped from the furnace through a bath of molten oxide of iron, whereby almost all the silicon contained in the iron is eliminated.

If the advances and improvements have been so great in the production of the pig iron they have also been equally so, if not greater, in the conversion of the pig metal into the different grades of steel. The economies effected during the last few years in open-hearth practice have been so great that to-day steel can be produced by this method practically as cheap as by the Bessemer process, and of far better and more uniform quality. While ten years ago the difference in the cost of production by the Bessemer and the open hearth was between \$3 and \$4 the real difference to-day is not much more than 50 cents a ton, and it is not presumptuous to predict that in the near future even this small excess will be wiped out altogether. These economies, most of which have been in the line of mechanical rather than metallurgical improvements, have made it possible to increase the size and the output of open hearth furnaces to an extent undreamed of five years ago. The mechanical charging machines invented by S. T. Wellman make it as easy now to operate a twenty ton furnace as it was ten years ago to run a five ton one, and while twenty-ton furnaces are still about the average there seems now to be no limit to what may be done by the introduction of the Wellman revolving furnaces which are already operated with fifty-ton charges at the Illinois Steel Company's works in South Chicago where the erection of a new seventy five-ton furnace is now contemplated.

### Armor-Plate Manufacture in England.

REVIEWING recent armor-plate episodes in the United States the *Iron and Coal Trades Review* of London says that the controversy here has thrown considerable light on a subject that is seldom brought to the front in England, and which to the general public is more or less of a sealed book. "In Great Britain," that paper says, "there are now four firms engaged in the manufacture of armor—John Brown & Co., Cammell & Co., and Vickers & Co., of Sheffield, and Beardmore & Co., of Glasgow. Each of these four firms is understood to compete against the others for contracts in the market; but, as a matter of fact, although the prices are not usually allowed to transpire, the contracts are really arranged. The total annual weight of armor given out by the British Government averages close on 12,000 tons, so that there is not more than an average of 3,000 tons for each firm. Contracts are, however, executed for foreign powers, and especially for China, Japan and the South and Central American Republics, at usually higher prices. These contracts are sometimes given out in competition with armor plate makers in other countries. Thus, the Bethlehem Company of the United States, some years ago, took a Russian order at \$249 (£50) per ton, which is, we believe, less than any firm in Great Britain would be prepared to quote for the same work. Other Russian contracts were subsequently given to the United States for hard faced or Harveyized armor, at £105 and £106 per ton. It would be interesting to know the inner history of these two contracts, which would have paid our own manufacturers well. How did it happen that Russia passed by Sheffield and went to the United States?"

The *Iron and Coal Trades Review* will be interested to know that the Russian Government has again awarded a contract for armor to an American firm, the Carnegie Steel Company. Two English firms competed, the Vickers and the Browns, but the order was placed in this country.

### The Empire State Express.

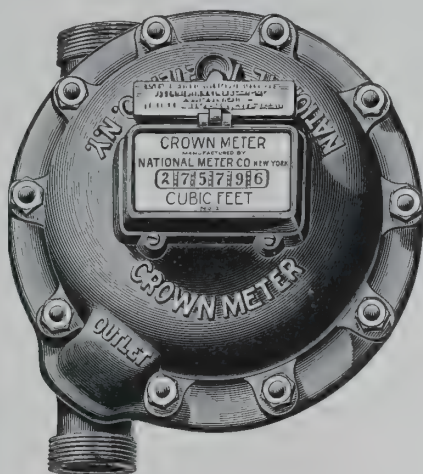
IN the six years that the Empire State Express has been in operation on the New York Central, it is credited with having made the largest aggregate of "record runs" for a regular train that can be found anywhere. In view of the permanent establishment of such fast schedules, General Superintendent Van Etten has furnished a condensed summary of the train sheet record of the train both westbound and eastbound, for the year 1897.

The schedule speed westbound, New York to Buffalo, 440.2 miles, including stops, is 53.35 miles an hour. Eastbound, Buffalo to New York, it is 48.1 miles an hour (50.6 Buffalo to Albany, and 46.04 Albany to New York). The train consists of four cars weighing about 330,000 pounds, and is drawn by engines weighing about 50 tons, with cylinders 19x24 inches, and driving-wheel about 7 feet in diameter. The westbound train arrives at the end of its trip within five minutes of schedule time on 268 days out of 313, 86 per cent., and the eastbound, 308 times out of 313, or 98 per cent.



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[JUNE, 1898]

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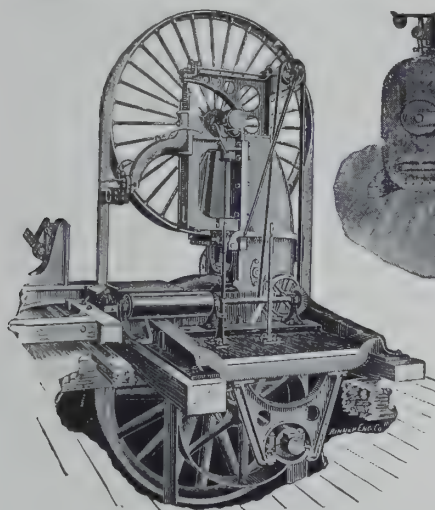
GENTLEMEN:

Replying to your favor of the 3d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

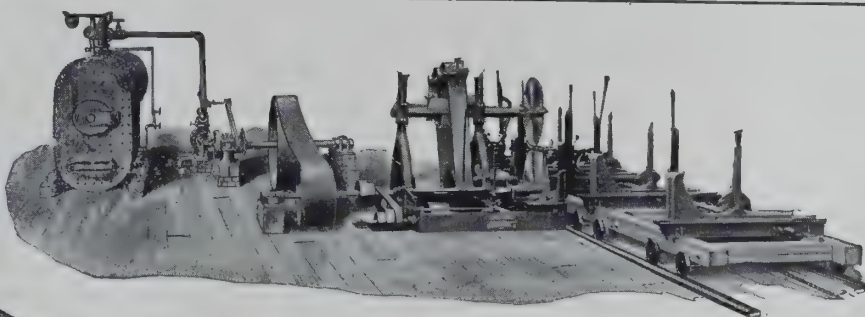
Yours very truly,

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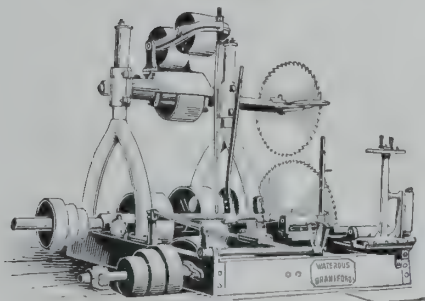
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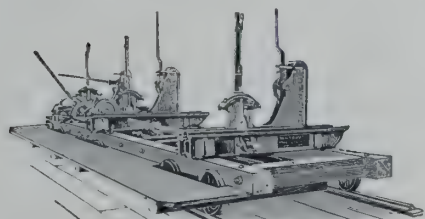
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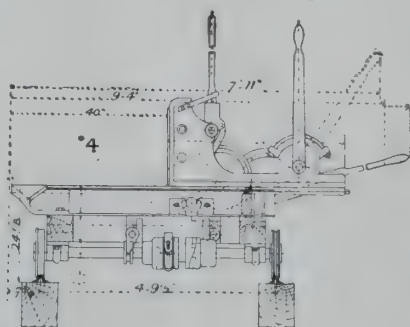
AUTOMATIC CUTTING-OFF SAW—2 men with this machine cut 60 cords of pulp wood 16 to 24 inches long, or 100 cords 48 inches long in 10 hours, taking logs from water and delivering cut wood to conveyor.



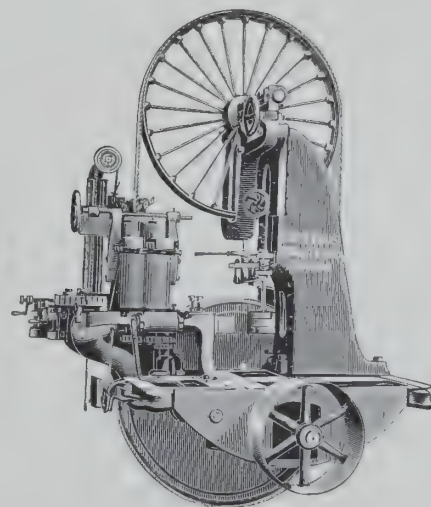
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## IMPRESSIONS OF AMERICAN RAILWAYS.

THE correspondent of the London *Times*, who is said to be W. M. Acworth, M. A., lecturer on railway questions in the London School of Economics, and who is now writing a series of articles for that journal under the title "Notes on American Railways," contributes another article to that paper on miscellaneous points, which impressed him in connection with railway administration in the United States. He says:

Permanent way is so largely an engineer's question that it may be dismissed very briefly. But no one who has travelled on the great American lines can help laughing when he is told, as one often is here, that there is no first-class permanent way in the States. For my own part I think that travelling in American is smoother—it certainly is less noisy—than here. And that American roads, laid with flat-footed rails, can stand even heavier traffic than our chair-supported rails has been, I think, sufficiently proved by experience on the Pennsylvania railway, where a trial length of standard London and North-western line, laid and maintained by Northwestern men, was knocked out of shape by a traffic which the standard Pennsylvania track survived uninjured.

Of the admirable condition in which this company keeps its road I had an opportunity to satisfy myself by taking part in the annual inspection. Once every year the main line between Pittsburg and Jersey City, some 450 miles, is inspected from end to end by the officers of the company. Four days are allowed for the work. Joining the party on the last day for the trip from Philadelphia to Jersey City, I found about 200 gentlemen assembled and four special trains in readiness. In front of each engine was a car with the forward end removed and seats rising tier above tier like the stalls in an amphitheatre. The trains were made up with the private cars of the principal officers and dining cars sufficient to seat the entire party at lunch time. It was somewhat chilly travelling against the wind, even at a speed of some eighteen or twenty miles an hour, but there was a plentiful supply of rugs. We were divided into several committees, one to report on the rails and rail fastenings, a second on the condition of the sleepers and ballast, a third on fences and ditches, and so on; and each of us had a printed card giving a table of the different sections into which the line was divided. As we reached the end of each section the pressure of our car wheels on a treadle rang an electric bell and notified the fact, and we then proceeded to write down the marks from one to nine, which in our judgment the condition of the section merited. At the end of the tour the marks were added up, and according to the average judgment of each committee, prizes of considerable value were allowed for the best-kept sections. To the eyes of a layman they all seemed to have attained almost equally ideal perfection.

A novelty in permanent way practice was introduced on the Pennsylvania railroad a few months back and has already been copied elsewhere. Every one knows what a nuisance to passengers is the dust rising in dry weather from sand or gravel ballast. But broken granite ballast, though free from dust, costs something like £1000 a mile, as against £300 for ordinary local gravel. On the Pennsylvania road they have taken to watering the gravel with refuse petroleum, which can be bought for 1d. per gallon. The petroleum is sprayed by the help of jets of compressed air, the total cost of the operation being under £10 per mile. The smell wears off in a few days, but the effect in preventing dust has been proved to last for months.

Compressed air is the newest and most handy maid-of-all-work on the American railways. I am told it is put to at least forty separate uses. A jet of compressed air sweeps and dusts the passenger car with a thoroughness one would be glad to see imitated here; it paints the freight cars and the station buildings. At the Chicago shops of the Illinois Central Railroad I saw riveting machines and cranes of four tons' capacity worked by the same force, while the bellows of the smithy fires had been replaced by a simple pipe and stop-cock. But the most interesting use of compressed air is in connection with automatic signaling.

That the English signaling system is on the whole unequalled in the world may be taken for granted. But our system grew up a generation back and rests on the employment of human agents, who may be stupid, or go to sleep, possibly even may strike. The Americans began later and, profiting by our experience, have begun, so to speak, on a higher plane. At all the most modern termini—in Boston, Jersey City, Philadelphia, St. Louis, and many more—our heavy levers, needing a strong man to pull them over, are replaced by small handles like bell handles that a lady could move with finger and thumb. The actual movement of the switches and signal arms is done by compressed air, which is released or cut off by an electric current. Out in the open country, where there are no complicated shunting movements to be effected,

the signalmen disappear altogether, and the trains as they pass over the line signal each to its successor, with unflinching precision, that (a) the section in front is occupied, or (b) that the section in front is clear, but the section next but one occupied, or (c) that at least two sections ahead are clear. It is commonly, and I believe, truly reported, that the Board of Trade is, to speak within the mark, not anxious to encourage automatic signalling here. In view of the great perfection which the system has now reached in America, and the rapidly rising expenses of English railways, it is, I submit, high time that in the public interest this obstructive attitude should be modified.

I have said America has not much to teach us in the conduct of passenger traffic. I should have excepted Boston, the organization of whose suburban service is beyond all praise. The "Consolidated" trains are grouped in what are termed "schools." Every quarter of an hour a train leaves the terminus for a point some five miles off, calling at all stations, and then turning off down a branch. A few minutes later a second train starts, runs without stopping to the five-mile point, and then calls at all stations for the next five miles or so. A few minutes later again a third train starts, and, running unchecked to the ten-mile point, prolongs the service thence to the furthest station in the suburban area. At the next quarter of an hour a fresh "school" of trains repeats the tale. The same system is in force for the return journey. The luckless inhabitants of not a few of our London suburbs might be thankful if the railway management of the largest city in the world would condescend sometimes to take a lesson from the "schools" of the "hub of the universe."

## Steel Railway Cars.

IN the first week of April the Pennsylvania Railroad Company placed an order, says the *Iron Age*, with the Schoen Pressed Steel Company, of Pittsburg, for 1,000 steel cars, the contract approximating \$1,000,000. This is the largest single contract ever given for steel cars, and the fact that it was placed by the Pennsylvania Railroad Company leads to the belief that other smaller lines will quickly adopt the use of steel cars, and that additional orders will soon follow.

The 1,000 cars ordered by the Pennsylvania Railroad Company will be the largest and strongest ever built. Each will be 10 feet high from the top of the rail. This will permit of an enormous capacity, and it is intended to carry 110,000 pounds of ore or 104,000 pounds of coal in each. The largest capacity yet attempted with wood has only been 80,000 pounds, and these have been monster affairs of great weight. The new steel cars will weigh only 37,000 pounds each. They will be built of unusual strength, and will have 5½ by 10-inch journals of open hearth steel. Between 11,000 and 12,000 tons of steel will be used in the construction of the order. Work on the cars will be started in July, and deliveries will begin that month and will continue through August and September.

Here we have another line of consumption of steel, that must become of very great importance to the manufacturers of that material. It will require millions of tons to replace the wooden cars now in use; and that they will all be superseded by steel cars is as certain as anything in the future can be. The life of a steel car will be to that of a wooden car what the life of a steel rail is to that of an iron rail, about as five is to one. And the price of wood suitable for the construction of cars will presently be as great as the price of the steel required for the purpose. What the Pennsylvania Road does, in the way of new equipment, can be safely done by any other road in the world; for the Pennsylvania is the most scientifically managed line in this country, perhaps in the world. Its example, as suggested in the foregoing, will induce many other lines to follow in its wake. The revolution from wood to steel, in this department of railway equipment, may now be said to be fairly begun, and it will not go backward.

**Three Notable Export Records Broken in April.**—On page 17 of this issue of THE AMERICAN EXPORTER mention is made of the fact that the exports of three important manufactures of iron and steel have shown such notable advances of late as to lead the Treasury Department to classify them separately for the first time this year. It is noteworthy in this connection that the exports for the month of April in all three of these groups of manufactures broke all previous records. The exports of pipes and fittings for that month were \$360,236, some \$58,000 more than were recorded for March, the best month previous. Safes were sold abroad to the amount of \$10,067, surpassing the best previous record, which was that of November, with March a close second. Structural iron and steel reached \$148,812, beating October by \$6,000 and March by \$28,000. The effect of war upon these exports is obvious.





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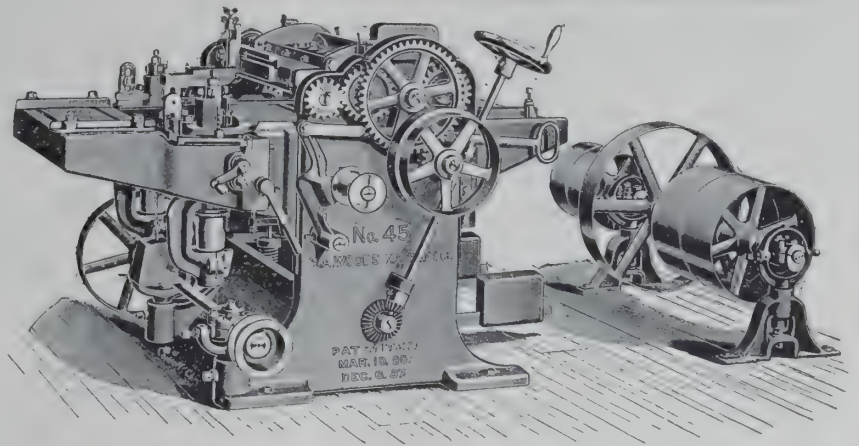
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REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.

MILLS EDWARD Master Schooner "Florence Shay."



### Production of Rails in the United States in 1897.

The American Iron and Steel Association has ascertained from the manufacturers that the production in the United States in 1897 of all kinds of rails, including light and heavy rails, and street, electric and mine rails, was 1,647,892 gross tons, against 1,122,010 tons in 1896, an increase of 525,882 tons, or over 46 per cent. The production of 1897 was composed of 1,614,399 tons of Bessemer steel rails rolled by the producers of domestic ingots; 30,121 tons of Bessemer steel rails re-rolled from old steel rails and rolled from purchased blooms; 500 tons of open hearth steel rails, and 2,872 tons of iron rails. The total production of Bessemer steel rails in 1897 amounted to 1,644,520 gross tons, against 1,116,958 tons in 1896. Of the production of 1897 Pennsylvania made 1,027,996 tons, as compared with 674,096 tons in 1896; Illinois and the remainder of the country made 616,524 tons, against 442,862 tons in 1896.

Ten States made rails in 1897, namely, Pennsylvania, Maryland, Alabama, Tennessee, Ohio, Illinois, Wisconsin, Colorado, Wyoming and California. All these States made Bessemer steel rails except Tennessee, Alabama and Wyoming. The production of Bessemer steel rails outside of Pennsylvania, Illinois, Ohio, Maryland and Wisconsin was very small. The iron rails were made in Pennsylvania, Tennessee, Alabama, Ohio, Illinois, Colorado and Wyoming. The open-hearth steel rails were produced in Alabama and California. Of the total production of rails in 1897 Pennsylvania made over 62 per cent., against over 60 per cent. in 1896. Illinois made over 26 per cent., against almost 28 per cent. in 1896. These two States made almost 89 per cent. of all the rails rolled in 1897, against a little over 88 per cent. in 1896. Of the total production of rails in 1897 there were 88,896 tons under 45 lbs. per yard; 1,223,435 tons between 45 and 85 lbs. and 335,561 tons over 85 lbs.

The rails reported which are known to have been rolled for street and electric railways in 1897 amounted to 122,244 gross tons, against 145,210 tons in 1896, a decrease of 22,966 tons. With the exception of a few hundred tons all were steel rails. The following table gives the production of street rails in this country from 1890 to 1897 in gross tons:

Years.	Gross tons.	Years.	Gross tons.
1890 .....	98,529	1894 .....	157,457
1891 .....	81,302	1895 .....	163,109
1892 .....	111,580	1896 .....	145,210
1893 .....	133,423	1897 .....	122,244

The following table gives the production of all kinds of rails from 1890 to 1897, in gross tons:

Years—Gross tons.	Iron.	Steel.	Total.
1890.....	13,882	1,871,425	1,885,307
1891.....	8,240	1,298,936	1,307,176
1892.....	10,437	1,541,407	1,551,844
1893.....	6,090	1,130,368	1,136,458
1894.....	4,674	1,017,098	1,021,772
1895.....	5,810	1,300,325	1,306,135
1896.....	4,347	1,117,663	1,122,010
1897.....	2,872	1,645,020	1,647,892

The maximum production of all kinds of rails in this country was reached in 1887, when 2,139,640 gross tons were made. The year of next largest production was 1890, the production being 1,885,307 tons. The next largest year was 1897, the production amounting to 1,647,892 tons.

### Traffic on Lake Superior.

THREE or four facts stand out boldly in the annual report of the traffic of Lake Superior, as evidenced by the passages of the Sault Canal for 1897. The most significant is the notable reduction in the price of conveying freight. This price has hovered about one mill per ton per mile for several years, or ever since the lake canals and connecting channels were deepened and the day of big ships began. In 1896 it touched 0.99 mill, but in 1897 it dropped to 0.83 mill, or about one twelfth of one cent, for carrying a ton of freight one mile on the Great Lakes. The history of transportation the world over does not show such a record. Present indications are that 1898 will see another and marked drop in the ton mile rate, for freights are averaging 5 to 10 cents less per ton than in 1897.

Another notable fact is the gradual diminution in the Canadian lake marine. For a number of years the percentage of this marine was from 8 to 5 of the entire lake fleet; but the past year, out of a commerce through the Sault of 18,954,000 tons, the Canadians have but about 2.5 per cent. Canada has spent nearly \$20,000,000 on her canals connecting Lake Superior with the Atlantic, and the United States has put out \$12,000,000 on her canals and connecting channels between Duluth, Chicago and Buffalo.

The steady growth in the size of lake ships is another interesting fact brought out in the report. It is shown that in 1897 there were 111 ships in the 3000 ton class, carrying loads averaging 3,400 tons; 26 in the 4,000-ton class,

averaging 4,450 tons; 28 in the 5,000 ton class, averaging 5,550 tons, and 8 in the 6,000-ton class, averaging 6,100 tons. A year ago there was not one vessel above the 5,000 tonners, while the present season the 6,000 ton class will consist of 15 or 20 ships, while the 7,000 ton ship will make its appearance. It is hard to tell where the limit is in the size of the lake ship—it has apparently not yet been reached. It is a fact that there are more 3 000 ton and bigger ships on the Great Lakes flying the American flag than on the oceans.

The largest cargo carried in 1897 was by the Amazon, 6,244 tons; the largest amount of cargo carried in the season was by the Andrew Carnegie, 130,956 tons, or a mile tonnage of 114 571,500; the greatest number of miles run in the season was 49,853 by the steamer Harlem. The canals were open 238 days out of the year, considerably longer than usual.

Total traffic of the lakes was valued at \$218,236,000, or \$58,660 800 more than in 1896. This was on a base value per ton of all commodities of \$11.50. In the present season the base price will be much higher. Cereals and flour, which last year formed 46 per cent. of the value, are this year worth 25 per cent. more; iron ore, which formed 17 5 per cent., is higher in value; copper, 11 per cent. last year, is worth 12 cents, against 10½ last year; lumber formed 5 per cent., and is valued at \$2 per 1,000 more than then, while coal and merchandise are, generally speaking, higher. It would not be surprising if the total value of this year's commerce might reach \$300,000,000. This will probably be carried with very little addition to the \$13,220,000 freight bill of 1897.

All the business of the year was carried in 525 steam and 323 sail or towing vessels, valued at \$44,377,100, of which all but 61, valued at \$2,001,400 were owned in the United States.—*Iron Age*.

### The United States at the Paris Exposition of 1900.

IT is satisfactory to know that the outlook for a successful and worthy exhibit on the part of the United States at the forthcoming great international exposition in Paris in 1900 is at present highly encouraging. At the outset the Special Commissioner, Major Moses P. Handy appointed by the President to represent this country, labored under serious disadvantages owing to the lateness with which Congress had made provision for his presence in Paris. The personal energy of the commissioner, supplemented by the courtesy and thoughtfulness of the French officials, soon reduced these to a minimum, however, and restored to this country whatever was lost through the delay. The following table indicates both the original and final allotments made to this country by the exposition officials, and the amount of the concessions made as a result of the efforts of the commissioner.

Department.	Group.	First Allotment. Sq. Feet.	Second Allotment. Sq. Feet.	Total Allotment. Sq. Feet.
Liberal arts .....	1 and 3	8,608	10,750	10,750
Fine arts .....	2	(a)	(a)	(a)
Machinery, electricity and appliances .....	4 and 5	37,660	48,420	48,420
Agriculture and food products ..	7 and 10	16,140	20,444	24,748
Horticulture .....	8	(a)	(a)	(a)
Forest, chase and fisheries .....	9	(a)	(a)	(a)
Mines and mining .....	11	5,380	5,380	7,532
Manufactures .....	12 and 15	8,608	21,520	21,520
Do. ....	13	10,760	12,916	12,916
Do. ....	14	8,608	4,301	4,301
Transportation and civil engineering .....	6	12,912	17,216	17,216
Social economy and hygiene ..	16	(a)	(a)	(a)
Colonization .....	17	(a)	(a)	(a)
Army and navy .....	18	(a)	(a)	(a)
Total .....		108,676	140,947	147,403

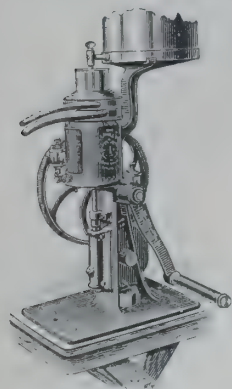
a Allotment not yet made.

The commissioner estimates that the total allotment will not be far from 200,000 square feet. In 1889, when the entire superficial area of the exposition was 240 acres, the space allotted to this country was 113,000 square feet. The commissioner calls attention to the fact that the increase in our allotment has kept pace with the increase in superficial area of the exposition as a whole, that for 1900 being about 336 acres, and adds that he believes that the space accorded to this country will be as large as that accorded to any other. In every case the authorities have assured him that the space granted to the exhibits of the United States shall be adjacent to that occupied by some great power.

It is too soon to speak at present regarding the details of the exhibits that will occupy these liberal concessions of space. Major Handy, before his unfortunate death, spoke of the necessity of insuring greater harmony and unity in the exhibits from this country as a whole, and there is no doubt that his successors will act on this wise advice and that the display made by the United States in 1900 will greatly surpass that made in 1889 in consequence. We shall endeavor to present in the pages of THE AMERICAN EXPORTER the latest intelligence regarding the forthcoming display of American manufactures and progress at Paris.



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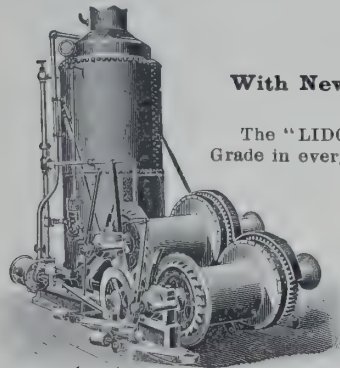
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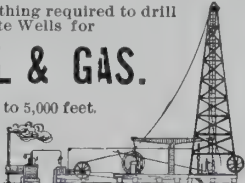
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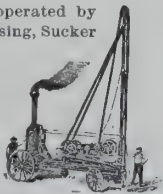
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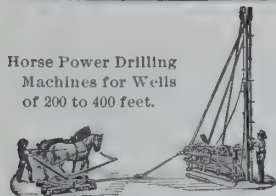
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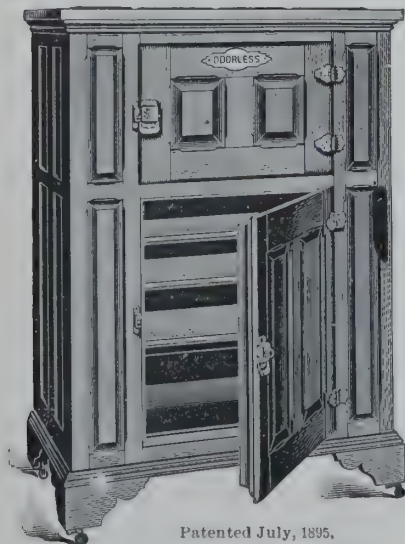
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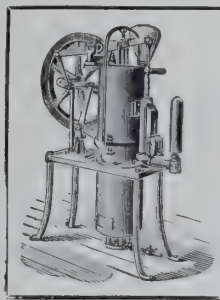
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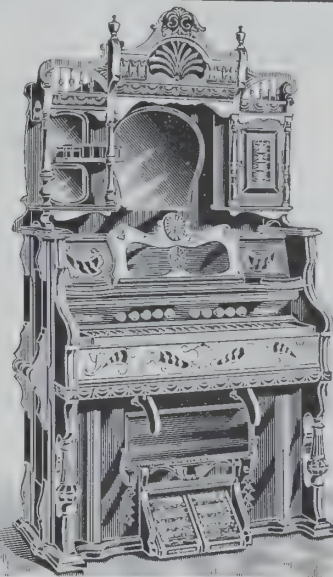
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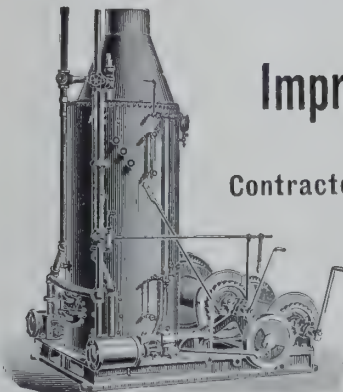
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## EXPORTS OF AMERICAN WRITING MACHINES AND PARTS.

IN the fiscal year ending June 30, 1897, the United States exported no less than \$1,453,117 worth of typewriting machines and parts. As the figures on this interesting and important branch of our manufactures were never stated separately prior to July, 1896, no comparison of these figures with those of previous years is possible, but it is certain that they are vastly in excess of any reached before that date and represent the high water mark, up to that time, of a steadily increasing foreign trade. The fact that the Treasury Department found it advisable to tabulate the figures on this subject separately is in itself sufficient evidence of this.

It is gratifying, therefore, to be able to observe that the exports of American typewriters, far from showing any falling off from these figures—considerable as they are when the small size and comparatively low price of a single machine is considered—show a large advance all along the line. Beginning in July, 1897, the Bureau of Statistics has presented the exports of typewriting machines by countries, and we accordingly are enabled to present the figures for the month of March and for the nine months beginning July 1st and ending March 31st with some detail, showing who are some of our more important customers for these machines and the state of our trade with each and all over the world:

EXPORTS OF TYPEWRITING MACHINES AND PARTS.

	March—		Increase or	9 Mos. End'g Mar—		Inc. or
	1897.	1898.	Decrease.	1897.	1898.	Decrease.
United Kingdom .....	\$84,179	\$106,967	+\$22,788	\$552,686	\$635,169	+\$82,483
France .....	16,068	14,101	-1,967	70,744	65,467	-5,277
Germany .....	23,736	50,247	+26,461	178,776	282,404	+103,628
Other Europe .....	12,821	28,692	+15,871	117,241	176,340	+59,099
British North America .....	3,237	4,021	+784	22,965	36,541	+13,575
Central American States and						
British Honduras .....	3,495	234	-2,261	10,230	2,223	-8,007
Mexico .....	2,795	2,477	-318	19,025	21,903	+2,878
Cuba and other West Indies .....	676	756	+80	6,945	4,212	-2,733
Argentina .....	637	465	-172	10,265	12,471	+2,206
Brazil .....	.....	327	+327	3,322	3,435	+113
Colombia .....	216	164	-52	2,433	3,605	+1,172
Other South America .....	822	2,457	+1,635	7,128	11,844	+4,716
China .....	225	341	+116	3,028	2,338	-690
East Indies: British .....	22	1,172	+1,150	6,098	7,153	+1,058
Japan .....	170	.....	-170	3,468	2,935	-535
British Australasia .....	5,011	400	-4,611	59,310	45,675	-13,635
Other Asia and Oceania .....	304	324	+20	3,514	6,387	+2,873
Africa .....	2,036	2,770	+734	15,137	21,110	+5,973
Total .....	\$156,500	\$215,915	+\$59,415	\$1,092,315	\$1,341,215	+\$248,900

These figures speak for themselves. In nine months of the present fiscal year the exports of typewriting machines have almost equalled those for the entire twelve months of 1897. For the nine months this shows a rate of increase of 22.7 per cent. But the increase for March of this year over the corresponding month of last was no less than 37.4 per cent., a highly satisfactory feature of the returns. These figures are an admirable illustration of the manner in which an established export trade in a reliable article of great popular demand and utility is superior to local influences and fluctuations. A sharp decline in the West Indies and Central America, owing to local revolutions, a slight falling off in China and Japan, owing quite possibly to the unsettled condition of matters in the far East, and a falling off in Australasia and France are all offset, and a great deal more than offset, by the increase in any one of half a dozen countries, Germany, for example, doubling her takings for March and increasing her imports for the nine months by over \$100,000. The total decline in these few instances, owing to local conditions, is so completely swallowed up in the general prosperity of the trade with the rest of the world as to leave a net increase of a quarter of a million for the first three-quarters of the fiscal year.

Since the foregoing was prepared the returns for April have been received from the Bureau of Statistics. It is gratifying to observe that the high rate of increase noted above for the month of March has not only been maintained, but has been very materially bettered. The exports of American typewriting machines and parts for 1898 amounted to \$206,005 as against \$138,232 for the same month in 1897, an increase of 49 per cent. It is noteworthy that France, which showed a slight decrease for March, shows a decided increase for April, the figures being: for April, 1897, \$9,478; for April, 1898, \$11,355. Germany shows an even greater increase for April than for March, as follows: April, 1897, \$22,593; April, 1898, \$52,221. Great Britain also shows a decided increase, April, 1898, surpassing 1897 by \$36,050 as against \$22,788 in March as above. Altogether it does not look at all as though the war was affecting the export trade in American typewriting machines adversely.

**A Chinese Typewriter.**—An American missionary in China has recently ordered a Chinese typewriter to be made in this country. It is said that some 40,000 separate characters are used by the Chinese, but only 4,500 of them are called for by the missionary, and these were arranged on a disk 30 inches in diameter. About 90 per cent. of his writings could be done with one third of these. The other two-thirds were used only occasionally, and with what might properly be called an experimental machine, the missionary for whom it was built could write about four times as fast as a Chinese student could by hand.

## Growth of American Exports of Manufactures.

DURING the first ten months of the fiscal year ending June 30, 1897, the exports of manufactures exceed by over \$40,000,000 the value of the manufactures imported, and it is probable that for the full year's record this excess will reach \$50,000,000. In no preceding year in the history of the country have the exports of our manufactures equalled in value the imports of manufactured articles. In the fiscal year 1897 the imports of manufactured articles exceeded the value of exports of manufactures by the sum of \$27,362,217; in 1896 by \$104,759,734 and in 1895 by \$121,413,783.

Nearly every branch of our great manufacturing industries has shared in this growth of our sales to other parts of the world. The exports of agricultural implements, for instance, which in 1888 were about \$2,600,000 in value, will in the year 1898 be in round numbers \$6,000,000. Locomotive engines, whose exportation in 1888 was less than \$500,000 in value, will in 1898 reach probably \$4,000,000, orders for more than 150 engines having been placed with the great manufacturing establishments during the past two months for use in China, Japan, Russia, Egypt, Australasia and South America. Bar iron, of which we exported 1,500,000 pounds in 1888, will amount to 10,000,000 pounds of exports in 1898. Builders' hardware, the exports of which in 1888 were valued at \$1,442,635 were last fiscal year \$4,152,836 in value. The exports of cut nails, which in 1888 amounted to 11,963,664 pounds, will in 1898 amount to more than 35,000,000 pounds, an increase of 200 per cent., while wire nails have increased over 1,000 per cent., the exports of wire, wrought and horseshoe nails in 1888 being 1,547,078 pounds, while those of 1898 will reach nearly, if not quite, 20,000,000 pounds.

Exports of iron plates and sheets, which in 1889 were less than 1,000,000 pounds, will in the year which ends with this month amount to nearly 8,000,000 pounds, while those of steel plates and sheets, which were but 119,419 pounds in 1888, will exceed 20,000,000 pounds in 1898. The total value of the exports of manufactures of iron and steel, which in 1888 amounted to \$17,763,034, will in 1898 exceed \$65,000,000. The exports of leather and manufactures thereof, which in 1888 amounted to less than \$10,000,000, will in 1898 exceed \$20,000,000 in value. Exports of illuminating oils, which in 1888 amounted to 456,000,000 gallons, will in 1898 exceed 800,000,000 gallons, while lubricating oils, which in 1888 were less than 23,000,000 gallons, will in 1898 reach 55,000,000 gallons.

The exportations of paraffine and paraffine fine wax, which in 1888 were 36,000,000 pounds, will in 1898 reach 140,000,000 pounds. Soap increases from 19,000,000 pounds in 1888 to over 27,000,000 pounds in 1898; glass and glassware from \$881,628 in 1888 to \$1,208,187 in 1897; manufactures of rubber from \$866,867 in 1888 to \$1,807,145 in 1898. Manufactures of cotton show an increase of 50 per cent. in the value of their exports during the past ten years; exports of chemicals have also increased 50 per cent. in value during the same time. Manufactures of brass have increased from \$308,124 in 1888 to over \$1,400,000 in 1898, while manufactures of copper, including ingots and bars, which in 1888 were \$3,812,798, were last year \$31,621,125, and seem likely to exceed that sum in 1898. In numerous other manufactured articles there have been similar gains, nearly the entire list having shared in a greater or less degree in the growth of the export trade during the past decade. The total exportation of manufactures in 1888 amounted to \$130,300,087, and in 1898 seem likely to reach nearly or quite \$290,000,000.

## American Technical Schools.

YOUNG railway men in the United States rise, when they do rise, by sheer force of character, and learn their profession by mother wit. Systematic instruction in the principles underlying their work is nowhere provided for. In the United States, while there is, so far as I know, little or no attempt made to educate the subordinate staff, as is done in the railway schools of many Continental countries, ample provision is made for the training of a higher class. At Harvard, Yale, Columbia and Chicago—and I doubt not at many of the other universities—leading economists like Hadley and Taussig lecture on railway questions in their economic and political aspect. The University of Chicago has actually a sub-professorship specially assigned to the "Economics of Transportation." The technical departments of these same universities, moreover, backed up by numerous technical colleges and institutes all over the country, lay themselves out to teach not only engineering in general, but railway engineering in particular. The Purdue University, for instance, at Lafayette, in Indiana, has in its engineering laboratory a full sized modern locomotive, and not a little benefit has the railway world received from the careful experiments there conducted into subjects such as steam distribution, counter balancing and compounding.—W. M. Ackworth in the London *Times*.



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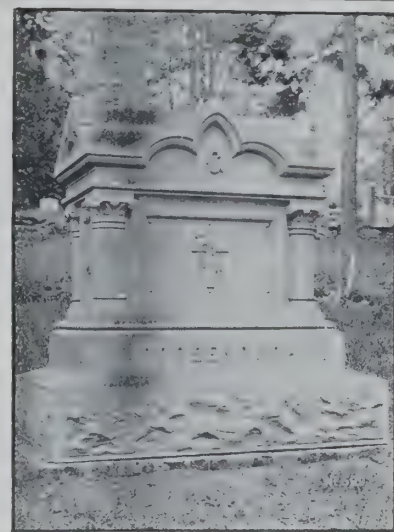
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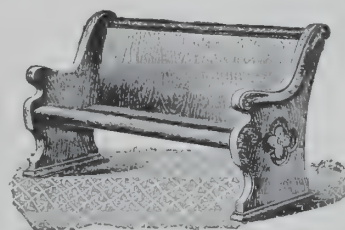
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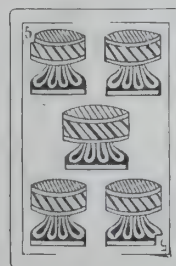
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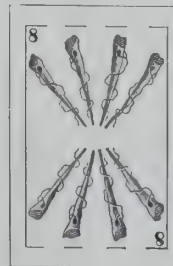


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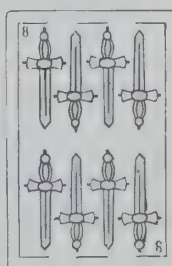


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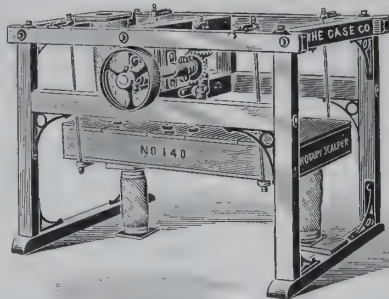
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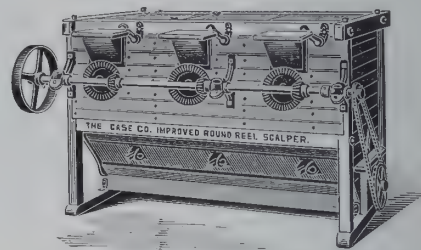
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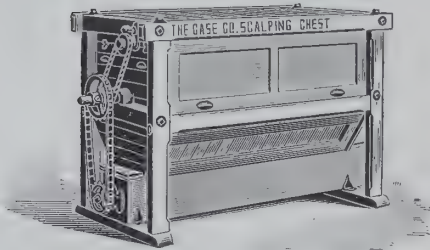
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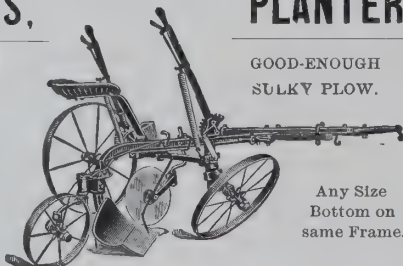
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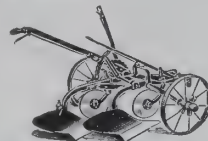


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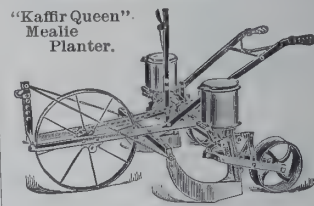


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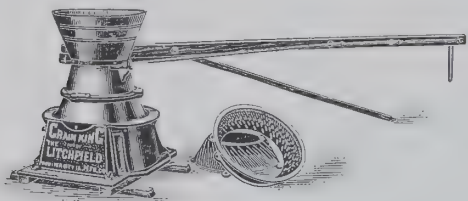
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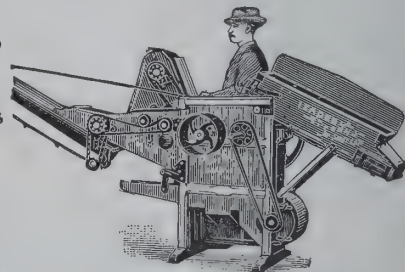
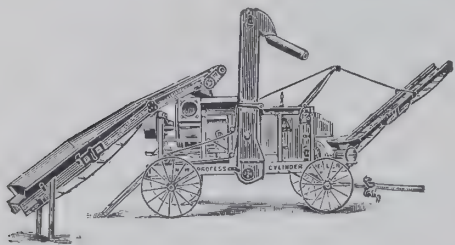
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CYCLONE FEED SPRING OR PICKER WHEEL SHELLERS, all sizes. NEW PROCESS  
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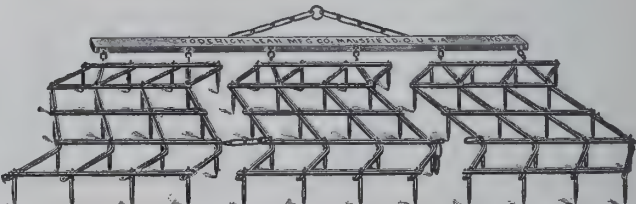
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A large variety of Styles, Sizes and Weights  
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Manner of Packing secures Lowest Rates for  
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Also manufacture Harrows, Cultivators and 140  
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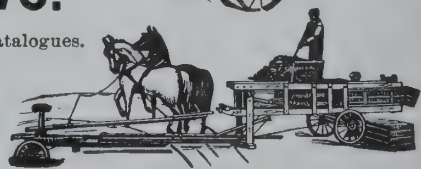
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Devoted to the Foreign Trade in Agricultural Machinery and Implements.

## EXPORTS OF AMERICAN AGRICULTURAL MACHINERY.

NO branch of our export trade is in a more thoroughly satisfactory condition than that devoted to agricultural machinery and implements. Its growth, while less marvellous than some, has been steady and rapid and our exports of this class of manufactures have long since assumed most imposing dimensions. The rate of progress may best be shown by a table giving the total exports of this description over a considerable period.

### EXPORTS OF AGRICULTURAL MACHINERY FROM 1870 TO 1898.

1870.	1880.	1885.	1890.	1896.	1897.
\$1,068,092	\$2,245,742	\$2,561,602	\$3,859,184	\$5,176,775	\$5,240,686
Nine months. 1897.			Nine months. 1898.		
\$3,170,308			\$3,864,540		

These figures show an increase of more than 390 per cent. in 27 years, beginning with exports already at the very respectable figure of over a million. The steadiness of the increase is particularly remarkable. We add, for the benefit of those who fear that the war is interfering with, or likely to interfere with this trade, the figures for the first quarter of the present year, as compared with those for the first quarter of 1897 which was, as shown above, a record year.

### EXPORTS FOR JANUARY, FEBRUARY AND MARCH, 1897 AND 1898.

January.		February.		March.	
1897.	1898.	1897.	1898.	1897.	1898.
\$194,994	\$340,303	\$419,140	\$666,671	\$1,231,126	\$1,470,397

Of perhaps greater interest and value are the statistics showing the destinations of these exports. It is not possible at this time to present figures embracing every nationality separately, which is the more to be regretted because the figures for Russia would, if obtainable, be very interesting, but the following table will give a fair general idea of who our leading customers are for this class of machinery, and the present condition of our trade with each as compared with last year.

### EXPORTS OF AGRICULTURAL MACHINERY—BY COUNTRIES.

Countries.	March.		Nine months Ending March.	
	1897.	1898.	1897.	1898.
United Kingdom .....	\$110,704	\$147,663	\$303,766	\$452,324
France .....	209,984	271,176	351,183	662,929
Germany .....	137,354	279,312	258,509	428,535
Other Europe .....	583,925	533,491	716,471	702,892
British North America .....	37,141	100,570	243,466	459,935
Central American States and British Honduras .....	1,100	211	24,362	14,213
Mexico .....	14,574	14,746	92,020	88,428
Santo Domingo .....	317	.....	952	837
Cuba .....	109	712	1,206	7,670
Puerto Rico .....	273	15	3,371	2,295
Other West Indies and Bermuda .....	492	644	5,072	4,065
Argentina .....	43,343	22,641	367,336	314,338
Brazil .....	1,535	5,126	17,020	21,250
Colombia .....	596	459	2,870	2,669
Other South America .....	8,493	15,040	127,833	148,102
East Indies—British .....	1,604	755	6,547	6,959
British Australasia .....	48,947	33,573	280,069	349,550
Other Asia and Oceania .....	6,464	22,696	24,483	26,969
Africa .....	24,181	21,567	343,772	159,587
Other countries .....	.....	.....	.....	323

Total...\$1 231,126 1,470,397 3,170,308 3,864,540

There has hardly ever been a year in the history of this trade in which our exports have shown an increase in so many different parts of the world and a decrease in so few. The West Indies, normally large buyers of this class of machinery, are, of course, practically *hors concours* for the present, although we trust that when we next have occasion to present statistics on this subject they may have resumed their usual prominent position. Trade with Argentina is notably subject to fluctuations, owing to varying rates of exchange and the success or failure of the wheat crop, but on the whole we are holding our own there and are gaining very decidedly throughout the rest of South America. Our trade with South Africa was so large a year ago that it is safe to assume that the market there was supplied for some time in advance, but it is satisfactory to note that we are now beginning to equal the record figures of last year

once more. Our already large trade with Canada has almost doubled in a year. In all parts of the world outside of Europe we are holding our own. In Europe the increase is little short of phenomenal. Great Britain takes half as much again, France and Germany almost double.

## The Maple Sugar Industry.

ACCORDING to a writer in the *Louisiana Planter*, the maple sugar season which has just closed has been the best for many years. The "run" of sap frequently lasts only ten days, beginning usually about April 1st. This year, however, the sap commenced to flow in most of the sugar districts as early as March 23d, and continued for three weeks. The cool, frosty nights and warm days which prevailed produced an abundant flow of sap, and the result was that an unusually large supply of sugar and syrup was secured.

The annual output of maple sugar in the United States is about 4,000 tons, the states which produce it in largest quantities being Michigan, Vermont and Pennsylvania. Wisconsin also held high rank among maple sugar states until forest fires a few years ago burned over the best maple groves in the region, nearly all the maple trees except those in the southern districts being destroyed.

The methods of tapping employed are similar in all maple sugar producing districts. The trees are bored to a depth of about 2 inches, and the holes thus made are fitted with spiles which convey the sap to receptacles placed at the base of the tree. The sap which accumulates in these receptacles is collected at intervals and boiled in a series of large cauldrons till its bulk is reduced by about six-sevenths. After this it is carried through a long boiling process in smaller vessels until a syrup having about 2 per cent. of the original bulk of the sap results, and from this the sugar is secured.

The yield of sugar per tree varies from two to six pounds, and, as this product sells for but 10 cents a pound, it can be seen that the industry is not very profitable unless engaged in upon a large scale. The syrup from which the sugar is made sells at \$1 a gallon, and since one gallon of syrup will produce only about eight pounds of sugar, the syrup is the more profitable product of the two.

## An Aerial Tramway to the Klondike.

ALL kinds of systems of transportation to the Klondike gold-mining region are being proposed. One of the oddest, to be employed on the Chilkoot route, is described as follows by a writer in the *Review of Reviews*:

On the Chilkoot route transportation enterprises appear to have taken a more definite shape, and from the means employed it is reasonable to expect quicker and more certain results. This means is the overhead cable construction, known as the aerial tramway, which from its airy name does not appeal very strongly to the practical mind not acquainted with the system, but which is known to mining engineers as a simple and comparatively inexpensive method of handling supplies destined to go over such a short land trip as offered by the Chilkoot. It is extensively used in very many mining sections to carry ore from quarry to smelter, and one is already in operation at the quartz mines of Juneau, Alaska. It claims as a basis for perfection in this case that it is not dependent on surface conditions; that it is not subject to disturbance from glaciers, landslides or snowdrifts; that the grades are no barrier to successful operation (as the supports for the cable track and traction cable are built on the points of the profile of the route), and that the tonnage capacity is very elastic.

The stations, or supports, are built on the high points of the route. These consist of large poles, 12 or 14 inches in diameter at the large end and varying from 18 to 30 feet in length; they average about 400 feet apart, but this space can be increased to 1,500 feet without in any way affecting successful operation. These poles have a 2 inch iron pin in their bottom which is fitted into a hole drilled in the granite; for further support the base of the pole is held in place by a cast iron shoe, also fitted to the rock; it is then held rigidly in place by small cable guys running from its top to the four corners of a square, the guys being kept taut by a simple device of turnbuckles. Crossing the pole at the top are arms, much like those on a telegraph pole, only stronger, and at the extreme of the top arms is the stationary or track cable, made of plow steel 1 inch in diameter and of great tensile strength. Two feet below the top arm is a second one, carrying on sheaves at its extremities the traction cable of  $\frac{5}{8}$  inch diameter. This cable is endless, and is driven by steam power from a plant located conveniently on the line. The car, or carrier, is suspended on a hanger which rests with two small wheels on the upper cable, and as the hook grips the lower moving cable the car is propelled forward at the rate of 250 feet per minute, making the through trip from Dyea to Lindemann in 8 hours. An ingenious construction of the hanger enables the cars to pass the supports.



### Remarkable Year of Trade.

THE Bureau of Statistics at Washington has just issued the statement of the country's foreign trade for April and for the ten months of the fiscal year, and the document makes a remarkable showing. The record had already been mentioned in telegraphic advices as the most remarkable in the history of the United States. In the past ten months the country has sold and exported more than twice as much merchandise as it has bought from abroad. To be exact, the total merchandise exports for the ten months were \$1,025,426,681, while the imports were \$511,181,186, an excess of exports of \$514 245 495.

This is far ahead of anything of the sort in recent years. In 1892, which, like the present year, followed a period of crop failures abroad, the excess of exports over imports amounted to \$202,875,686. Last year made a still more favorable showing, the excess of exports establishing a new record, but the excess was only \$287,613,144, whereas for the present fiscal year it is estimated by the Bureau of Statistics the excess for the full twelve months ending with June will probably be \$600,000,000.

In 85 years prior to 1876 there were only 16 years in which the exports exceeded the imports. Since 1876 there have been only three years in which the exports have not exceeded the imports, but never previously has the excess been half so great as that which the present year is expected to show. The year 1879, preceding a period of great prosperity, was a record one in our foreign trade for a long time, but the excess of exports over imports that year was but \$264,661,000.

For the ten months so far in the present fiscal year the exports of agricultural products alone have been more than \$100,000,000 in excess of those of the corresponding ten months of the preceding year, and they will exceed by many millions the agricultural exports of any year in the country's history. The failures of the crops of foreign countries has resulted in the rushing out of immense quantities of our cereals to fill depleted granaries abroad. While exports have increased, imports have decreased. The resulting immense favorable trade balance conservative predictions agree can mean but one thing—prosperity to this country.

### The California Vintage.

FOR the nine years preceding 1897 the normal vintage yield in California was 15,000,000 gallons, and the doubling of this last year is explained in the *San Francisco Chronicle* to be due to the abandonment of haphazard methods, and the approximation to science through the experiments and advice of the viticultural department of the University of California. Vines to which the soil and climate of the State are adapted are now generally cultivated, and the knowledge of what grapes to grow in order to get a desirable blend in the wine is spreading.

Not only has the quantity of wine produced in the State doubled in the last ten years, but, as Professor Hilgard points out in his report of 1896, "a very notable improvement in the average quality of our wines has occurred within the past five or six years, and the high excellence of the product obtained in so many cases renders any further continuance of slipshod methods inexcusable. Hereafter California wines may appear in the world's markets under their own names, instead of being, as has heretofore been too largely the case, disguised under foreign ones, when of good quality, while the poorer qualities were sure to be placed upon the market with the true statement of their California origin."

### Laundry Machinery.

MANGLES in one form or another have been used for hundreds of years, but the steam mangle of the present day is essentially a modern machine. Steam mangles are made of various sizes, with rolls ranging in length from 48 inches to 120 inches. One of the rolls is of hollow steel, and heated with steam. The auxiliary rolls are of iron, covered with cotton cloth and blankets or felt-ing. Steam mangles are made also with two hot rolls. In ironing such things as sheets and tablecloths by hand, it is customary to iron one side only. Steam mangles with a single hot roll iron in that manner; with two hot rolls the steam mangle irons with a smooth finish on both sides.

Mangles are used only for flat articles; for things without buttons or buckles; for sheets and pillow cases, tablecloths and napkins, towels and handkerchiefs, and so on. Mangles of the largest size will iron a hotel's washing, taken just as it comes, 14,000 pieces in a day; of small pieces, such as napkins, they will iron four times as many pieces in a day.

From the washing machine the things go to an extractor to be dried. The extractor revolves at a high speed, and the moisture is whirled out by centrif-

ugal action. From the extractor, just damp enough to work well, the things go to the mangle. Such things as sheets are fed into the great ironing machine by two men, each holding a corner. There is a fixed table, as long as the rolls, attached to the machine on the other side; two men receive the sheet there and fold it. In ironing small pieces like napkins and towels on such a machine they would be fed in by a row of girls standing on one side, and be received by another row of girls on the other side. On the largest machines there would be six or eight girls on each side. American steam mangles are used not only in this country, but they are sold in all the countries of Europe as well.

A great many mangles are made with wood rolls of polished maple. Such mangles are sometimes operated by power, but commonly by hand. They are used in hotels and laundries and restaurants and for household work.

Mangles with wood rolls are exported to the various countries of Spanish-America and to South Africa and Australia.—*N. Y. Sun.*

### Advantages of an Oil Fuel on Ships.

A WRITER in a London journal says: "It appears that petroleum or other kindred forms of liquid fuel are coming much into vogue for navigation purposes, with results that are stated to be economical and satisfactory. Some of the advantages of using liquid fuel are obvious. Much valuable space which has now to be sacrificed for the coal bunkers can be saved; the oil can be kept in ballast tanks at the bottom of the ship, an arrangement which greatly augments the stability of the vessel, and the oil can gradually, as it is consumed, be replaced by water. The size of the stokehold can be reduced considerably, and the number of stokers diminished in the proportion of one to four. In stormy weather, and in case water should gain access to the stokehold and put the fire out, it is considerably more troublesome and takes more time to relight a coal fire than to restart the oil fire, and the risk of accidents by scalding is diminished. The danger of fire in the coal bunkers will not be replaced by any similar risk connected with the use of oil, while a ship having oil at its disposal may, by pouring a certain quantity overboard in stormy weather, avoid much trouble. Oil fuel also further reduces sizes and increases rapidity in raising steam of higher pressure, as the fire grate and ash pit can be done away with altogether, the length of the funnel can be reduced, and a system of water tubes is better suited to the fierce fire of liquid fuel than the straight or curved surface of an ordinary thick boiler plate."

### Exports of American Paraffin.

THE export trade of this country in paraffin and paraffin wax has grown up very rapidly. Twenty-five years ago this material was unknown to commerce, and only fifteen years ago it began to be exported. In 1884 the exports of the product was more than 17,000,000 pounds, of which 16,000,000 pounds went to Great Britain. In the fiscal year 1897 the American exports of paraffin and paraffin wax reached about 126,000,000 pounds, of which the United Kingdom took 82,000,000 pounds. In this country the consumption of this article has increased at a still more rapid rate, but the production has more than kept pace with the demand. The marked chemical indifference of the substance has led to its introduction in connection with a large number of industries. It is employed for lining wooden and metal vessels for acids, and voltaic batteries, in electric insulation, in coating splints and other appliances subject to septic influences, as a vehicle for fulminate in the manufacture of matches, as a covering for cartridges, for preserving fruits and vegetables by forming a coating over their surface, and for an almost endless variety of similar purposes. It is also used extensively in the manufacture of candles, for securing a high polish on clothes in laundries and for waterproofing paper and fabrics.

**New York-Japan Steamship Line.**—Consul Skinner, of Marseilles, says, under date of April 2, 1898: "The Indrapura is about to leave this port for New York, to take her place in a fleet of new boats just being built for the purpose of plying between the ports of Japan and New York. Until now the traffic between New York and Japan has been in the control of unattached vessels sailing at irregular intervals, and I am informed that the pioneer effort to maintain a regular service is about to be undertaken by the organizers of the Indra Line, the title word signifying 'Kings of India.' The fleet will fly the British flag and will include the following ships, each with an average carrying capacity of 3,150 tons: Indravelli, Indralema, Indrani, Indra and Indrapura. The increasing commerce between New York and Japan is responsible for the organization of the Indra Line. Monthly sailings will be undertaken, and the boats will touch at Marseilles when not completely loaded for either New York or Japan. The Indrapura will make the line's maiden trip, and will be freighted with Baldwin locomotives and miscellaneous manufactures.



**Magic Oscillating Curry Comb.** \$15.00 per gross.**All-Steel Garden Rake,**  
pressed from a sheet of best steel.

Made in 10, 12, 14 and 16 teeth.  
\$1.85, \$2.00, \$2.20, \$2.40 per doz.

We also manufacture the  
HUMANE..... \$12.00 per gross.  
Shedder Mane Comb.... 10.00 "  
Flexible back:  
A1, A2, A3,  
\$16.00, \$18.00, \$12.00 per gross.  
B1, B2, B3,  
\$15.00, \$12.00, \$11.00 per gross.  
Stiff back..... 6 and 8 bars,  
\$8.00, \$9.00.  
Open back..... 6 and 8 bars.  
\$6.00, \$7.00.  
Shingle back,  
5, 6 and 8 bars.

Write for Catalogue of  
Posthole Diggers, Etc.

**F. E. KOHLER & CO.**

Canton, Ohio, U. S. A.

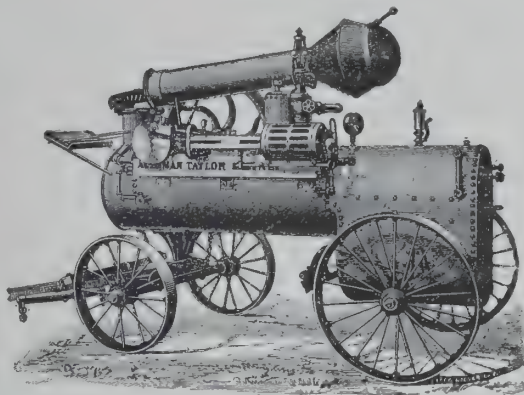
Orders filled through any responsible export house in the United States.

**THE AULTMAN & TAYLOR MACHINERY CO.,**

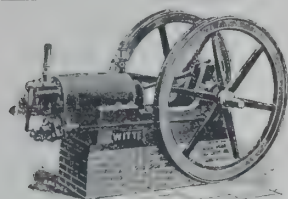
MANSFIELD, Ohio, U. S. A.

MANUFACTURERS  
OF

Threshing Machines,  
Saw Mills,  
Stationary, Portable  
and Traction  
Engines,  
Horse Powers,  
Water Tube Boilers  
and  
Iron Tanks



Write us for Details, Prices and any desired Information.

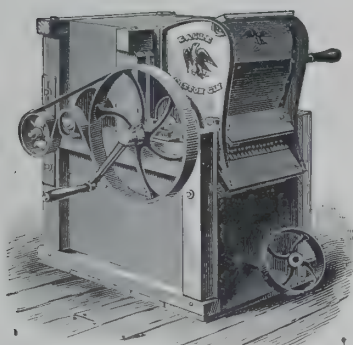
**WITTE GASOLINE ENGINES.**

Built in Parts like a Steam Engine.

Fully warranted. No risk. Up to date. Economical on water and fuel. Catalogue J.

WITTE IRON WORKS CO., 1218 Walnut Street, Kansas City, Mo., U. S. A.

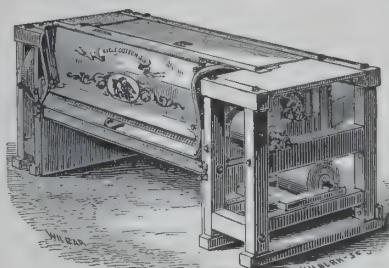
Will run in any place or altitude.  
With the electric igniter we can use  
any grade of gas or liquid fuel.

**EAGLE COTTON GINS.**

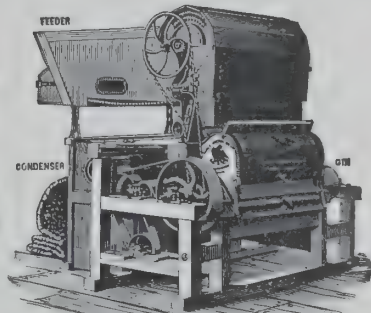
These Gins enjoy a BETTER REPUTATION THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are PREFERRED to all others made, on account of their STRENGTH, SIMPLICITY, DURABILITY, the amount and EXCELLENCE of the work they accomplish, and the RAPIDITY of their operation.

For further details, illustrated Catalogues will be furnished on application.

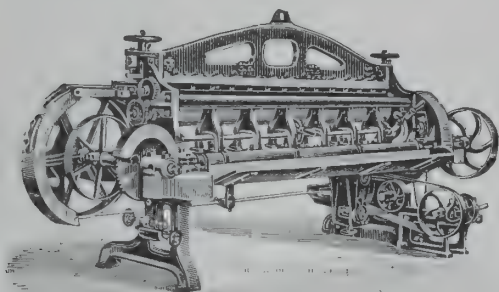
**Eagle Cotton Gin Co.** { FORMERLY Bates, Hyde & Co. } **Bridgewater, Mass.**



Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser.



No. 53. Band Knife Splitting Machine for splitting hides and skins either in the lime or when half or wholly tanned.

**GERMAN-AMERICAN MACHINERY CO., Ltd.**

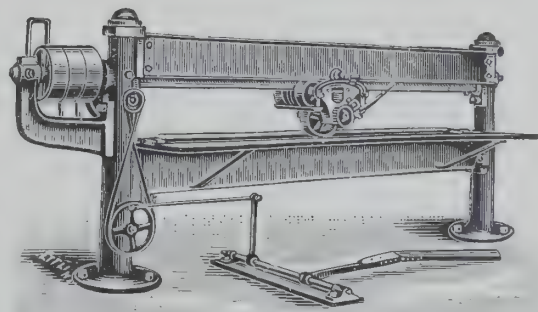
FRANKFORT-ON-THE-MAIN, GERMANY.

Established since 1862.

SPECIALTY: Machines and Complete Outfits for all Leather Trades, for Boot and Shoe Factories, Shoe Upper Manufacturers, Tanners, Carriers, Belt Manufacturers, Army, Navy and Police Contractors, Saddlers and Harness Makers.

Catalogues in all modern languages (richly illustrated) and full particulars on application.

Telegraphic address: "Moenus Frankfortmain."  
A B C Code and Staudt & Hundius Code used.



No. 76. Butt Roller for tanners.

IS SUPERIOR TO "CORN STARCH," "ARROWROOT," "SAGO," ETC.



TRADE **MAIZENA** MARK.  
(DURVEA.)

This is a brand for a preparation from the choicest parts of Indian Corn, or Maize, making a healthy and nutritious article of food, and a most

**DELICIOUS TABLE LUXURY.**

ITS PURITY AND DELICACY ADAPT IT TO BEING USED IN A GREAT VARIETY OF EXQUISITE DISHES

ENCOMIUMS TO ITS MERITS:

LONDON, 1862. "Supremely Excellent."

BRUSSELS, 1876. "Notably Excellent."

PARIS, 1867. "Perfection in Preparation."

CENTENNIAL, 1876. "Notably and Absolutely Pure."

PARIS, 1878. "Best Produced of its Class"

FRANKLIN INSTITUTE. "Superior Merit"

Gold Medal Awarded  
"MAIZENA."



Paris Exposition,  
1889.

Put up exclusively by THE NATIONAL STARCH MFG CO., successors to (Messrs DURVEA) GLEN COVE MANUFACTURING Co., N. Y., U. S. A., in 40 and 20 pound boxes, in packages of 1 lb. and ½ lb., and may be obtained through all importing houses of South and Central America, and the West Indies, and all export houses of the United States and Canada.

None GENUINE without "DURVEA" appearing on the face of Package



## EXPORT NEWS IN THE CONSULAR REPORTS.

## AMERICAN SHOES IN EUROPEAN MARKETS.

ALTHOUGH the wages of American shoe operatives are far higher than those paid to similar work people in this country the labor cost of a pair of American factory made shoes is definitely less than that of a similar pair of shoes made in a German factory. The reason for this apparent anomaly is that the American factory system is admittedly superior to that of any other country. In our country shoe manufacture has been specialized; the whole energy of a factory, equipped with the most perfect machinery, is concentrated upon the production of one, two or three special classes of shoes—one factory turning out, for instance, only women's shoes, another men's and another children's footwear of a certain style and price.

The German manufacturers, on the other hand, have generally not yet passed the stage at which a single factory is spread out over the entire industry, and makes everything that the retail dealer may want—shoes of several grades and patterns for both sexes and for all ages and conditions of life. The result of these different systems will be readily guessed. While a European shoe factory employing, say, 100 operatives, turns out 200 pairs of "Goodyear welt" shoes per day, the American factory with the same number of employees produces from 450 to 500 pairs, and, although the wages paid to the American work people are higher per day, the labor cost of their work is less per pair than that of the German product. A Chicago shoe manufacturer was invited last Summer to visit a shoe factory in South Germany that had been equipped with modern American machinery, and, having looked through the place, was asked by the proprietor what he thought of it. His reply was:

"Your factory is all right, your machinery up to date; but if any American shoe man should try to make as many kinds of shoes as you do he would be swamped within six months."

How long this disparity may continue may be uncertain, but experienced German shoe manufacturers, who understand the subject fully, assert that it is impossible for them under existing conditions to change their system and concentrate their work upon fewer qualities. Further, the American factory made shoe is unequalled in style of cut, elegance of finish and serviceable qualities by shoes of similar cost made in any other country. Says Mr. Max Vanstraaten, a shoe merchant of Amsterdam, who has had long experience in selling American-made shoes on the Continent, particularly in Germany and the Netherlands:

"It is my opinion that the Americans are at least half a century ahead in the manufacture of footwear with regard to elegance style, and excellence of workmanship."

As has been already stated, there is nothing of local manufacture in the German market that will at all compare in point of style, durability, cheapness and excellence of workmanship with the shoes for men, women and youths that are retailed throughout the United States at from \$2.50 to \$3.50 per pair. A dealer in this district who had bought from a travelling salesman a lot of American made shoes, which he sold promptly at high prices, states their only defect as merchandise was that they made his customers discontented with his other goods. The European made shoe is generally broad, short and stumpy, with flat, nearly straight, sole, while the American shoe conforms to the anatomy of the foot, and, being correctly modelled, prevents the foot from pushing forward and maintains a shapeliness and elegance of form that is appreciated here as highly as anywhere.

Only the grossest ignorance can obscure the fact that in the Germany of today a large and rapidly growing percentage of the people, especially in all the cities and larger towns, are educated and progressive in all that relates to dress and the comforts and refinements of living. They appreciate, understand, and are perfectly able and willing to purchase, at reasonable cost, what is best and most becoming, and they have no serious prejudice against an imported article which is superior to that of home manufacture. For more than a century France has been the arbiter in matters of taste, and her exports of high priced goods, in which style and beauty form an important element of market value, have made that country rich and prosperous. In one branch of manufacture—that of factory made footwear—the United States has now taken the lead, and the only question is whether our manufacturers will show sufficient skill and enterprise as merchants to reap the harvest that they have sown—*Frank H. Mason, U. S. Consul-General at Frankfurt, Feb. 16, 1898.*

## EXPOSITION IN SOUTH AFRICA.

Under date of April 18, 1898, Consul General Stowe, of Cape town, says: "I am requested to present to the manufacturers and producers of America the advantages of exhibiting their productions at the exhibition to be held at Grahamstown, Africa, from December 15, 1898, to January 21, 1899. It will be known as the South African Industrial and Art Exhibition, and is guaranteed

by the governors of Cape Colony, South African Republic, Orange Free State and Natal, and the high commissioners of Rhodesia and Basutoland. Over \$100,000 has been subscribed, and exhibits from all parts of the world have been asked.

"There are five classifications of exhibits, viz: (a) Raw materials; (b) manufactures; (c) mining and machinery; (d) natural history and science; (e) arts.

"To the manufacturers of agricultural implements and vehicles, and mining, cotton, woollen, electrical, wood working, brick-making, sugar and all other kinds of machinery, this exhibition will be invaluable.

## NEW AMERICAN-NETHERLANDS STEAMSHIP LINE.

Under date of May 6, 1898, Consul Listoe, of Rotterdam, says: "This week a new steamship service has been opened between New York, Philadelphia and Rotterdam. Steamers belonging to the company starting the service have already been plying between the aforesaid American ports and Rotterdam since January last, but it is the intention now to make it a regular fortnightly service. The first departing steamer will be the Norwegian steamship *Lovstakken*, from New York on May 10th, followed by the steamship *Blaamaanden* on May 25th. For the Philadelphia service three steamers—the *Queenswood*, *Cresyl* and *Avona*—will be used. The line will carry freight only.

## Millions of Spools.

THE spool factories of Maine turn out annually about 250,000,000 spools, which will hold 50,000,000,000 yards of thread—200 yards to the spool. There are seventeen of these factories in the State, employing 550 hands, at average wages of \$1.50 a day each, or \$247,500 a year total. In the making of the spools, 30,500 cords of white birch are used. The timber is worth \$4 a cord. A large part of the spool timber cut in Maine is not manufactured there, but shipped from Bangor to great factories in England and Scotland. This year Bangor exported 6,978,668 feet of spool bars to the United Kingdom, the value being \$144,000, and more will be shipped next year. There is practically no limit to the supply of white birch available.

The so-called "novelty mills" of Maine are numerous all through the hard wood districts. In these mills are turned out all kinds of little wooden boxes, many of which are used by druggists; checker boxes, checkers, dice boxes, wooden stoppers, handles of a thousand kinds and shapes, toothpicks by the million, ladders, swings, sleds, school desks and chairs, toy carts and wheelbarrows, tables, desks, cycle stands, baby sleighs and other things too numerous to mention.

One factory has just completed an order for 8,000,000 checkers and 200,000 dice boxes, and at another factory in the same town they have made this year 525,000,000 toothpicks. One firm has made 5,000,000 skewers, such as are used by butchers. Wooden bicycle rims are also an important article of manufacture. The product of these factories goes to all parts of the world. The timber used was once considered practically worthless.

**Exports of Agricultural Machinery for April.**—Since the article on "Exports of American Agricultural Machinery," at the head of this department, was printed, the returns for April have been published by the Treasury Department at Washington. It is interesting to note that although the returns show the usual Spring decline observable at this season from the figures for February and March, they show a far greater rate of increase over the corresponding figures for April a year ago. The exports for April, 1897, were \$852,097, those for the same month this year, \$1,292,524, an increase of \$440,427, as against an increase of \$239,271 in March.

**Important Innovation in Steel-Making.**—The Carnegie Steel Company is reported to have recently made a great innovation in the manufacture of steel. They turn the hot metal that comes from the Duquesne Steel Works into the open hearth or basic furnaces at Homestead. The using of molten iron in basic furnaces is something that has never been tried in America. It was attempted in England ten years ago, but the iron burnt out the furnaces, and the experiment proved expensive. At the Homestead Steel Works the scrap that is necessary in making open hearth steel is placed in the furnace before the molten metal is poured into it, thus preventing a repetition of the disaster experienced in England.

**Export of American Roofing Slate.**—The exports of roofing slate from the United States are growing rapidly. From \$53,796 worth in March, 1897, they increased to \$123,555 worth in March, 1898. For the nine months ending March 31, 1898, they were valued at \$1,003,011 as against only \$485,198 in the same period during the previous year. This line of exports has developed entirely during the past three years, the exports for entire fiscal year 1895 having been only \$38,806. The exports of the product for the fiscal year 1896 were \$266,385, and for 1897 they were \$780,112. About 70 per cent. of these exports are made through New York, 13 per cent. from Philadelphia, and 12 per cent. from Baltimore. During the fiscal year 90 per cent. of the exports of this product went to Great Britain, Australia took 8 per cent., and of the remaining 2 per cent. the greater part went to Canada.





**SIMPLY MILK,** as pure, rich and natural as it is obtained from the cow, treated with neatness and cleanliness, reduced by evaporation to a cream-like fluid and freed by sterilization from all possible germ life. Such is

## Highland Evaporated Cream.

As it is not combined with cane-sugar or any other foreign substance, and as it may be readily diluted with water to any desired strength, it fills every purpose of either fluid milk or cream. It is particularly valuable as food for infants and invalids. It is attractively labelled. It never thickens or spoils while sealed in the can. In the open state it keeps sweet from 12 to 24 hours longer than fluid milk.

GOLD MEDAL by Universal Exposition at Paris in 1889.

MEDAL and DIPLOMA by World's Columbian Exposition at Chicago in 1893.

Send for prices and particulars, either direct or through your commission house.

**HELVETIA MILK CONDENSING CO., Highland, Ill., U. S. A.**



## Our Idea of Paint is an ECONOMIC Idea;

It is PROTECTION! The absolute protection which wooden and metallic surfaces must have in order to endure, and secured at the lowest possible first cost. We do not attach fanciful names to our products. We furnish paints especially adapted to the service required, in which the main constituents (carbon, graphite, asphaltum, oxide of iron, zinc and lead, linseed oil and japan) are certified to as to quality and proportions. The price is exactly the commercial values of these constituents—no more. All our products guaranteed absolutely pure; machinery the most modern. Let us have your acquaintance; we will deserve your confidence. Write for samples, circulars and prices.

**NATIONAL PAINT WORKS,**

Williamsport, Pa., U. S. A.

## The HOLMES & EDWARDS SILVER CO., BRIDGEPORT, CONN. U. S. A.

### The UNIQUE

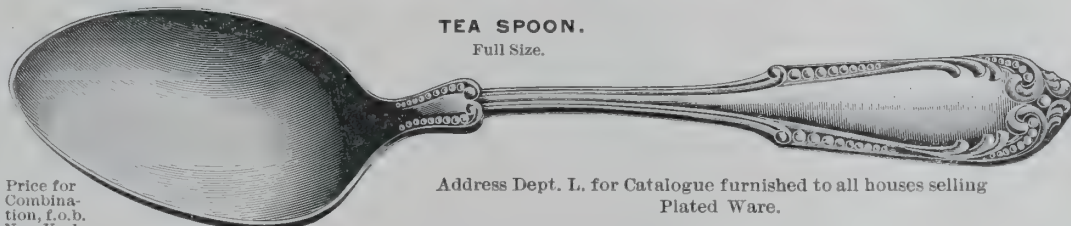
is the most pleasing design in Spoons and Forks yet produced. The wearing qualities of the Spoon are unsurpassed. Send order for

Combination No. 53, consisting of

- 6 doz. Unique Tea Spoons, XIV Plate, Extra Sectional.
- 3 doz. Unique Table Spoons, XIV Plate, Extra Sectional.
- 3 doz. Unique Medium Forks, XIV Plate, Extra Sectional.
- 6 doz. Unique Round End Medium Knives, 12 dwt.

Price for Combination, f.o.b. New York,

**\$47.50.**



TEA SPOON.  
Full Size.

Address Dept. L. for Catalogue furnished to all houses selling Plated Ware.

**THE HOLMES & EDWARDS SILVER CO., East Bridgeport, Conn., U. S. A.**

NEW YORK SALESROOM: 218 Broadway, St. Paul Building.

The following articles for table use are made in the UNIQUE pattern:

Tea Spoons,  
Table Spoons,  
Dessert Spoons,  
Dessert and  
Table Forks,  
Coffee Spoons,  
Fruit Forks,  
Sugar Shells,  
Butter Knives,  
Ladles, Etc.

**MACHINE TOOLS FOR WORKING IRON OR STEEL.**  
**EQUIPMENTS** for Locomotive and Car Shops,  
Machine and Boiler Shops, Ship Yards, Steam Forges,  
Rolling Mills, Brass Works.

**JOHN BERTRAM & SONS,**

**DUNDAS,**

**Ontario, - Canada.**

Write for Catalogue.



## Pike's BOX CALF Polish

IS THE ONLY PREPARATION MANUFACTURED FOR POLISHING BOX CALF SHOES.

Send for quotations, Catalogue "D."

## Pike's Disinfecting Fluid

THE MOST RELIABLE CLEANER AND DISINFECTANT ON THE MARKET.

Send for quotations, Catalogue "J."



**PIKE MANUFACTURING CO.,**

**- Worcester, Mass., U. S. A.**

## JAMES HILL MFG. CO.

PROVIDENCE, R. I., U. S. A.

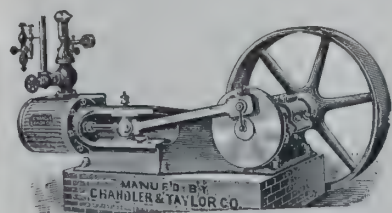
Manufacturers  
of

Write for Catalogues "O" and "P."

Roving Cans, viz.: Vulcan Fibre, Hill's IXXX Tin and all kinds of Mill Boxes and Cans.

Also Galvanized Sheet Iron Goods, Ash and Garbage Cans, Fire Pails and Buckets, etc.

For sale through commission houses or direct.



STRONG.

WELL BUILT.

SERVICEABLE.

## STEAM ENGINES.

12 to 100 Horse Power. Suitable for Heavy Continuous Work. Every Engine TESTED under full load.

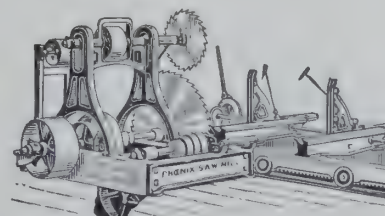
**Suitable Portable and Stationary BOILERS**

On hand for immediate delivery.

CIRCULAR SAW MILLS for all classes of work and MULAY MILLS for Light Power.

Send for Circular "C."

**CHANDLER & TAYLOR CO., Indianapolis, Indiana, U. S. A.**







OUR advice to dealers is to handle Bicycles that are mechanically correct in design—those that have all up-to-date features—no fads, but practical, new improvements that benefit both wheel and rider. Such are.....

**FRAME.**—Best quality of weldless steel tubing is used. Main frame, 1 1/4-inch; head, 1 1/4-inch; lower rear stays, 3/4-inch, D shape, tapered to 1/2-inch; upper rear stays, 3/4-inch.

**FRAME CONNECTIONS.**—Flush joints.

**SPROCKETS.**—Steel detachable, 20, 22, 24 and 26 tooth front; 8, 9 and 10 tooth rear.

**HANDLE BARS.**—Steel adjustable.

**WHEELS.**—28-inch, fitted with steel piano wire swaged spokes.

**RIMS.**—Wood or steel.

## “Imperial Wheels”

REGISTERED TRADE MARK.



**BEARINGS.**—Disc adjusting, made from best tool steel, scientifically tempered and carefully ground to remove any roughness caused by tempering.

**BALLS** are kept in place by ball-retainers, which, in connection with felt washers, serve as dust shields.

**OIL CUPS** are provided, which convey the oil direct to the bearings.

**HUBS AND CRANK-HANGER.**—Barrel pattern.

**WHEEL BASE,** 43 1/2 inches.

**WIDTH OF TREAD,** 5 1/2 inches.

**CRANKS AND SHAFT.**—Two-piece, joined in center.

**FINISH.**—Black, maroon or green, plain or striped and decorated.

**PEDALS** are made rat-trap, so constructed that rubbers can be attached.

**CHAINS.**—Superior make, “B” block pattern, centers and pins hardened.

We also make **HIGH-GRADE TANDEM**s and **JUVENILE WHEELS**.

### LIST PRICES:

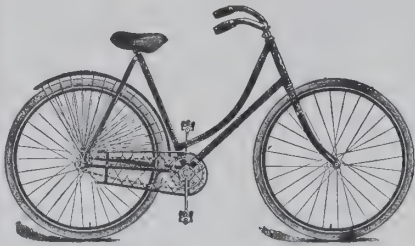
IMPERIAL MODELS, Nos. 38 and 39, - - \$75 each. IMPERIAL JUVENILE MODELS, 5 and 6, - \$40 each.  
IMPERIAL MODELS, Nos. 58 and 59, - - 60 each. IMPERIAL TANDEM, - - - - - 100 each.

**Special Discount to Reliable Dealers.**

Correspondence solicited.

**AMES & FROST COMPANY, “A” CHICAGO, ILL., U. S. A.**

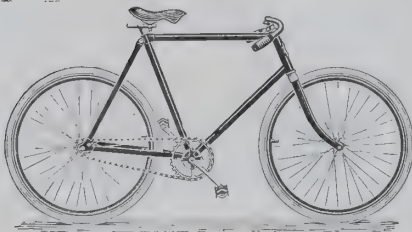
Floor space occupies five and one-half acres. Capital invested in the manufacture of Bicycles, 800,000 dollars. Business established in 1869.



## Our Tribune Bicycles

## THE BLACK MFG. CO., ERIE, PA., U. S. A.

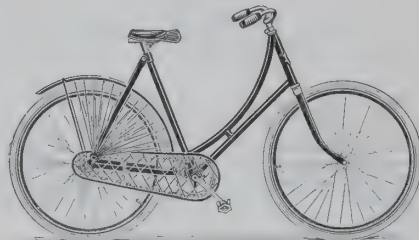
are known the world over for their excellent finish and reliable quality.  
Write for export prices. We deliver our machines properly boxed, freight prepaid, to New York City.



Tribune Model 33. Price, \$50.00.

Model 33 is a bicycle of excellent quality and finish, and far superior to many machines listing at higher price. The frame is weldless steel tubing of best quality, built in two heights, 23 and 25 inches; wheels, 28 inches diameter; gear, 73; cranks, 7 inches. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, gold striped, nickel trimming. Weight, about 23 1/2 lbs.

**ARENA MODEL M.** Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 34. Price, \$50.00.

Model 34 is practically the same as Model 33, excepting that it is built with drop frame, 20 1/2 or 22 1/2 inches, for ladies' use. Weight, about 24 1/2 lbs.

**ARENA MODEL L** is very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.

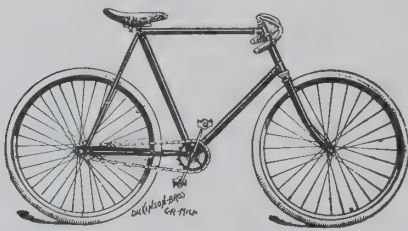


Tribune Model 350. Price, \$75.00.

Model 350 is built for road racing and for all purposes where a light wheel is desired. The frame is built in 23-inch height only. Drop to hanger, 2 1/2 inches; 7-inch cranks; Tribune special single-tube racing tires. Weight, about 21 lbs. Finish, black, gold striped.

**We build also a large variety of higher-priced wheels, including TANDEM, TRIPLETS, ETC.**

Handsome illustrated catalogue describing our full line, **MAILED FREE.**



Halladay Roadster, \$100. Discount, 45 per cent.



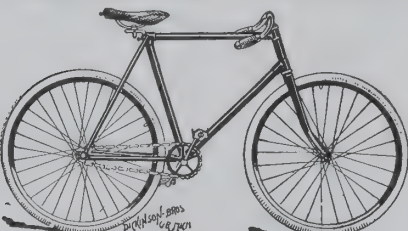
Lady Halladay, \$100. Discount, 45 per cent.



Lady Aetna, \$75. Discount, 50—5 per cent.



Aetna Roadster, \$75. Discount, 50—5 per cent.



26-inch Boys' Aetna, \$50. Discount, 40 per cent.



26-inch Girls' Aetna, \$50. Discount, 40 per cent.



24-inch Girls' Aetna, \$40. Discount, 35 per cent.



24-inch Boys' Aetna, \$40. Discount, 35 per cent.

## MARION CYCLE COMPANY,

MARION, IND., U. S. A.

The Largest and Most Complete Line of Bicycles made in America.

## Halladay AND Aetna Bicycles

Strictly of the Highest Grade.  
Absolutely Guaranteed.

Prices quoted with discounts are our **BEST** and cannot be beat for quality offered. Can refer to largest dealers in America. Complete line for reliable service. Orders accepted through reliable commission houses. Mail exact copy of order direct to us. Direct orders must be accompanied by Draft on New York or San Francisco. All goods carefully boxed for ocean shipment, F. O. B. New York; or delivered San Francisco or New Orleans, \$1.00 net extra per machine. Send for Art Catalogue mailed free.





### Exports of American Bicycles.

PR'OR to July 1896 the exports of American bicycles were so insignificant that the Bureau of Statistics in the United States Treasury Department did not consider it necessary to classify them by themselves as a separate item. Accordingly it is impossible to compile any figures bearing upon our exports of this description earlier than 1896. During the twelve months of 1896, however, we know from the official returns that the exports of American "cycles and parts" amounted to the very imposing sum of \$1,898,012 or nearly two million dollars. The following year witnessed an expansion of this foreign trade on the part of American bicycle manufacturers that is without parallel in the records of our export statistics. The grand total of the sales of American bicycles abroad during the twelve months of 1897 was \$7,005,323, or an increase of 269 per cent. in a single year.

After this amazing growth it was inevitable that there should be, if not a reaction, at least a period of comparative quiet. It is decidedly satisfactory to find, however, that we have more than held our own in spite of the great height to which the high-water mark of our foreign sales had been carried. We append a brief table showing the sales for the first quarter of the present year and also for the first nine months of the fiscal year ending June 30, 1898. The reader has only to recollect that the figures given for 1897 represent not only the high-water mark of our export sales up to that date but an enormous increase over those of the year preceding to appreciate the significance of the corresponding figures for 1898.

#### EXPORTS OF AMERICAN BICYCLES, JANUARY TO MARCH, 1897 AND 1898.

January.	February.	March.	Nine months ending
1897.	1898.	1897.	1898.
\$480,992	\$674,117	\$565,743	\$754,476
		\$977,214	\$958,729
		\$4,165,680	\$4,426,466

An increase for the nine months of 5.7 per cent over the wonderful record of 1897.

### The '96-'97 Campaigns of American Bicycle Makers in Europe.

PROBABLY no legitimate commercial campaign was ever as dashing and successful as that of the American bicycle makers in Europe during the years 1896 and 1897. Their first reconnaissance in 1895 gave no hint of the magnitude nor direction of the operations that followed it; for in that year the sum total of foreign sales did not reach a quarter of a million dollars, so insignificant a total that its constituent items travel officially incognito under the head of "other carriages."

Bicycle exports from the United States for 1895 were valued at \$243,721, destination then unnoticed and now immaterial. Within the next twelve months their value was \$3,796,022, of which amount Europe paid 58.5 per cent., other American countries 23.5, Asia, Australia and Oceania 16.4 and Africa 1.6 per cent., the United Kingdom alone taking more than a third of the whole amount.

Some imminent expansion into foreign markets might well have been suspected of an industry comprehending 200 firms, with a capital of \$20,000,000, employing 25,000 men in making machines, 500,000 of which had been sold in the home market during 1895. But in that year, wherein the American export business was next to nothing, Great Britain's foreign trade in bicycles had amounted to \$6,747,000. That year's export record impressed the English speculator, as well as the investor; more capital went into established plants, many new ones were got under way, an epidemic of bicycle company promoting set in, England's capacity for bicycle making increased tremendously, and so did her next year's foreign sales. But in that very year, wherein England sold \$9,000,000 worth abroad, American manufacturers sold \$1,300,000 worth in England; while in 1897 American sales in England exceeded \$2,000,000, and British exports, judging from returns covering the first nine months of last year, must have fallen off 15 per cent. During those two years the English bicycle business suffered from a severe case of overdevelopment and overconfidence, complicated with a high degree of contempt for competition in general and

American competition in particular. Sales to Germany have risen from \$300,000 in 1896 to \$1,300,000 in 1897, and without mishap ought to reach well toward \$2,000,000 for 1898. The French trade, thought light heretofore, shows steady growth and is free from captious hindrances. Elsewhere in Europe the trade shows steady progress.

Comparing 1897 with 1896 European takings increased from \$2,229,437 to \$4,901,558, while there was great improvement in the trade with Argentina, Brazil, Japan and the far East. American makers took a shot at every market last year, and perhaps some distant region which showed up \$50,000 or so for that season may reach ten times that during the current year.

### The Small Parts.

IN the manufacture of a bicycle the greatest care must be taken with the small parts which constitute it, and on which all its strength depends. It seems scarcely possible to the outsider that in a modern safety there are by actual count—including the various parts of the chain, balls, washers, spokes, etc.—just about 1,000 pieces. In the chain alone there are some 250 parts, while there are only a few less than 200 balls in a machine and over all some 50 washers—all this before any account is made of the various connections of the frame and the spokes and belts and screws all over the machine. The manufacture of the more important of these small parts forms one of the most interesting processes in the making of the bicycle. Roughly, the parts may be divided into two classes—those on which great strain comes and those which are subjected to friction in the operation of the machine. The former, including such parts as the joints of the frame, the sprocket wheel and the hubs, are first shaped in the forge shop. In the dingy recesses of this place a dozen thumping drops and chattering trip hammers beat the metal into the shape of their dies. This insures the strength of the parts.

In cast metal there is ever a likelihood of air bubbles being formed, and it is impossible to tell just where they will appear, so that one can never be sure that the casting is not weak at just the point where the severest strain may come. But under the tremendous blows of the hammer these air bubbles are an impossibility, and the maker can be sure of the strength of his work. To the outsider who is lucky enough to visit a first-class cycle factory it is a fascinating sight to watch the hammers beat out the red-hot metal parts. They are made quite a little larger than they are to appear in the bicycle, so that the rough exterior can be smoothed down by the various metal-shaving machines in the other departments. A rear hub, for instance, looks like a small dumb-bell when it comes out of the forge, and a front sprocket is simply a solid, flat metal disk, with a raised rim.

### Bicycle Patents in the United States.

THE history of bicycle invention in this country presents many interesting features. The number of patents issued by the United States on rider-propelled vehicles prior to the application of Lallement for a patent on his velocipede was only 20. At that time all of these were classified by the Patent Office as "carriages and wagons," and were included in the class having that original title. By January 1, 1869, 43 patents for such vehicles had been issued. With the year 1869 the "velocipede mania" came upon the country. In that year velocipede patents were increased by about 200, and in consequence were grouped together as a subclass of "carriages and wagons," and officially designated "velocipedes." After the mania of 1869 invention in velocipedes remained practically dead until 1876, when the English exhibit of bicycles at the Centennial Exposition gave it an impetus. Until the year 1890, however, when the influence of the pneumatic tire began to be felt, the growth of invention relating to cycles was comparatively slow. In 1890 one Assistant Examiner in the Patent Office was able to examine all applications filed in this class of invention. Since 1890 nearly 4,000 of the 5,000 United States patents for velocipedes have been granted.

Since 1892 the applications have become so numerous that velocipedes now form by themselves one examining division, requiring the services of one examiner, nine assistant examiners and five clerks.

The applications for cycle patents, not including accessories, gear cutting and tube-drawing machines and special machines designed for use in cycle factories, for the year 1892 numbered about 600; for 1894 about 825; in 1895, 1,500; in 1896 about 3,300, and in 1897 about 3,500. The number of patents granted in 1892 for cycles was, in round numbers, 325; in 1893, 380; in 1894, 380; in 1895, 370; in 1896, 586; in 1897, including bicycle wheels and tires, 930.



## CYCLE-MAKING MACHINERY.

IN few others of the industrial arts has there been such progress in recent years as the art of working sheet metal into commercial products. In the beginning of this art, the operations of cutting off, blanking, cutting and forming were exceedingly simple, but the requirements of metal workers have had the effect of focusing the efforts of many minds on the adaptation of the original and primitive methods used in such work to the special needs of the special lines of manufacture. A vast number of articles are now made of sheet metal, which were, but a few years ago, produced, or would have been produced, by casting, forging, or in the lathe, boring mill or at the bench.

The great demand for cheaper goods and the great desirability of uniformity and interchangeability of parts have had much to do with the development of these methods. Forming operations especially have become, in many classes of work, very complex, and the art of drawing sheet metals has come to a high state of perfection and usefulness. Automatic machines and auxiliary devices for feeding sheets and strips of metal into presses, and for other purposes having in view rapidity and economy of production, have been invented and brought into service.

It is not surprising, then, that in so highly developed a branch of manufacture as the production of bicycles, the student of sheet metal tools and machinery should find a field in which to develop valuable ideas. Some of the parts of a bicycle—such, for instance, as the side piece or pieces of the pedal—would, naturally, and as a matter of course, be made of sheet metal. Other parts, which until recently had been made almost exclusively by drop-forging and machine finishing, are now made very extensively by press and die operations out of sheet steel. Such are the crankhanger, upper and lower head-lugs, seat-post lug, handle bar T's, fork crowns, head binder, etc. Those who advocate making these parts of sheet metal claim that they are equally as strong and serviceable as drop-forgings, finish even more uniformly and have great advantage on the score of economy. Full details of the various operations involved it would be impossible to give, mainly on account of their great number and variety, but the general principles, however, may be briefly outlined.

The press operations involved in bicycle work are cutting, drawing and forming. The cutting of the blank, which, by subsequent operations, is to be drawn or formed into shape, is usually a separate operation. As such it is, of course, simple, requiring a punching die for the punching and a press of suitable strength and proper dimensions for operating the tools. Double dies are used for blanking certain parts, as, for example, the rear sprockets and rear fork ends. The punch, of course, corresponds, and the die is provided with a stripper. For the sprocket wheel, the work is fed from right to left, and a centre hole is cut out first, and as the strip is set to gauge a second time, the perimeter is cut, while the same stroke of the press punches another hole. In this way one complete blank is formed by each stroke of the press, except the first and last on the strip. The tools are made in this way for the reason that when the cutting edges have less than a certain space between them, the work is distorted, and the tools are not durable. Most blanking operations may be done in ordinary cutting and punching presses. For such heavy work as punching the sprocket blank, a powerfully-gearred press is required.

Many of the forming operations and the lighter work are done in moderate-size presses. For others, presses having longer stroke and greater power are required; while regular drawing presses are necessary where deep drawing operations are involved. One of the simplest forming operations is that of "U-ing" up the strip which forms the sides of a rat-trap pedal. These strips usually have quite a number of perforations, which make necessary a blanking and perforating operation. The method of forming requires a press with quite a long stroke, in order to push the strip to the bottom of the die. An inversion of this operation may be done in a press of shorter stroke, but requires sufficient space between the bed and cross head of the press to accommodate a "horn bolster." A regular horn press having the single upright column and no bed, but with the horns screwed directly into the frame, is convenient for this operation.

A special branch of press and die work in the production of the complete bicycle is making side links for chains. For this work automatic feeds are used. The left hand rolls carry the strip into the dies. Double dies are used, the first of which pinches the holes, and the second cuts the perimeter. An attachment on the slide releases the pressure of the rolls on the stock at every stroke, so that if the work does not come over the second die with absolute accuracy, it may be centred by the pilot pin, with which the cutting die is provided. The rolls at the right carry off the scrap. Single roll feeds are also used which operate similarly, but are not provided with scrap rolls.

After the links have been punched, they are sometimes submitted to the

action of the dies, which burnish their edges by pushing them through a highly-polished die, slightly smaller than the link. They are fed into the die by means of the tube-feed. This feed is used in the same class of presses as the roll feeds. It is sometimes made interchangeable with the single-roll feed. Presses and dies are used for considerable work in connection with the manufacture of bicycles aside from sheet metal work. Drop-forgings are always used for cranks; generally for the sprockets, and by many of the leading and most conservative makers for all frame connections. For these, heavy drop-presses are used.

For handlebar bending, a press with a long stroke and adjustable bed, similar in general form to those just mentioned, but heavier, is used. The work is usually done in cast iron dies, the number of operations required depending on the curve of the handlebar. To prevent the tube from crushing at the point where it bends, various devices are used, such as filling it with sand, melted resin, steel balls or inserting a coil of steel spring. These are but a few of the machines used in a modern American bicycle factory with the shop handling methods in vogue here. It will be noticed that every operation represents a great saving of labor, and especially of skill, as compared to the methods in use before such machinery was invented, or rather, was adapted to bicycle manufacture.

## Reciprocity with France.

THE United States and France have concluded the first commercial agreement entered into under section 3 of the Dingley Tariff law. The negotiations have been pending for the last eight months, and after many vicissitudes were concluded May 21, when Ambassador Cambon, in behalf of France, and John A. Kasson, Reciprocity Commissioner for the United States, affixed their signatures to the formal agreement. It makes important changes in the tariff rates on a number of articles constituting the chief trade between this country and France. The particular advantages secured by the United States are on meat products and lard compounds, France reducing her rates one-half on meat products and about one third on lard compounds. The chief benefits to France are in reduction in rates on brandies, stillled wine, vermouth and works of art.

By the terms of the agreement the new rates went into effect on June 1. Under the terms of the law the President issued a proclamation granting the reciprocal reductions specified in the agreement. The French authorities at Paris have decreed a reduction in the French rates in accordance with the agreement.

The conclusion of the agreement is a source of general congratulation among the officials of the State Department and of the French Embassy. Several reciprocity negotiations have been in progress, and it was thought those with Great Britain were likely to be concluded first. The French negotiations began last October, when M. Patenotre was the French Ambassador here.

Aside from the tariff changes made by the new agreement, the convention is regarded as significant in showing the good will existing between the United States and France. In official circles there never has been any question as to the continued cordiality between the two countries, but in unofficial quarters there have been reports of friction. It is believed that the agreement will serve to dispel misapprehension as to the satisfactory relations between the two governments, and that it will be quite as beneficial in increasing the good will between the two republics as the trade. The benefit of the French minimum tariff which is granted to various products of the soil and industry of the United States is especially advantageous to western industries, including the large meat packing industries of Chicago, Kansas City, Omaha and St. Louis. As a result of these concessions it is believed among officials that the agreement will have a beneficial influence in increasing the interest and co-operation of the West and the country in general in the French Exposition in 1900.

**Exports of Special Machinery for April.**—On the first page of the section devoted to Ironmongery appears an article on certain new statistics published by the United States Government statisticians relating to American export trade. The following figures may be regarded as supplementary to that article. They show the returns on special machinery for the month of April: Electrical machinery, \$185,314; metal working, \$390,213; pumps and pumping, \$160,246; shoe machinery, \$81,536. These figures, while in no instance surpassing the best record already made, are well to the front and indicate no falling off in exports of this class.

—The Fairbanks Company, of No. 311 Broadway, reports satisfactory sales of scales to Mexico, Chili and Peru. A large cargo has been ordered from these countries, amounting altogether to more than 1,500 scales.





The Best, Easiest-Running and Highest-Grade Bicycles on Earth Are the '98

\$75.00

**"SYLPHS."**

\$75.00

They contain more up-to-date and practical improvements than any other machines, and are acknowledged to be, both at home and abroad, the finest machines made.

They are ESPECIALLY adapted for Export Trade. We are appointing agencies in many foreign countries, and we want to hear from reliable agents in all countries. Our "Sylphs," together with a full line of **"OVERLAND" Cycles**, are money catchers, and you will make a mistake if you fail to write us before you contract.

**"OVERLAND" Cycles**, all sizes, all patterns, \$40.00 to \$50.00.

**ROUSE, HAZARD & CO., Manufacturers, Peoria, Ill., U. S. A.**

**L. C. SMITH GUNS.**

ALL BORED FOR  
NITRO POWDER.

Guaranteed never to shoot loose.

8, 10, 12 and 16 Gauges.

We use Whitworth Fluid Steel, Crown Steel and Damascus Barrels.

Send for Catalogue.

We now put Ejector Mechanism on all our different grades.



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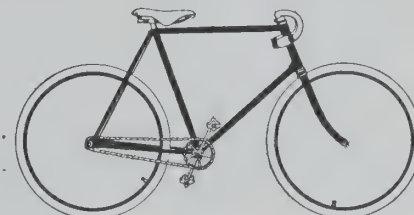
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**Beauty,  
Strength,  
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Easy Running Qualities.**

These Bicycles embody all the latest improvements. Send for catalogue.



**THE HUNTER ARMS CO.** Fulton, N.Y., U. S. A.

## OUR WHEELS

are designed to suit the peculiar foreign climate.

THEY ARE STRONG, EASY RUNNING AND ELEGANT. STEEL RIMS, FRONT AND REAR MUD GUARDS AND BRAKES SUPPLIED IF ORDERED.

Write for trade and cash discount and for catalogues direct or through reliable commission house, with copy of order to us.

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## IMPERIAL Bicycle Lanterns

ARE FAVORITES THE WORLD OVER.

**WHY?**

They will neither blow out nor jar out.  
They are strong, safe, clean, attractive.  
They produce a large, bright light. Are fitted with fine magnifying lense.  
They are made from the very best material and possess positive merit.

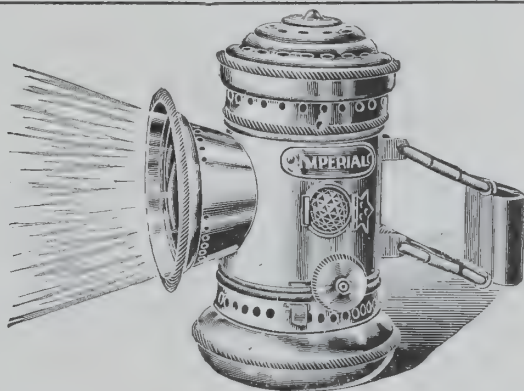
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SEND FOR '98 CATALOGUE,

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List, Standard,

**\$60.00.**

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**\$80.00.**



### Sterling Bicycle Bells

ARE THE BEST IN THE WORLD.

Made in all sizes and styles. (32 numbers.) Send for Catalogue "B."

**N. N. HILL BRASS COMPANY,**  
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### No More Rust.

Our "Three in One" Lubricant Contains no Acid.

Prevents Rust on All Metals.

The only perfect Lubricant for Bicycles, Guns, Sewing Machines, Reels, Etc. Never gums or hardens. For cleaning Bicycles or Fire Arms after shooting. It has no equal. It is transparent and clean to use. Correspondence solicited. Send for Catalogue "C." Order through Export Commission Houses in this country.

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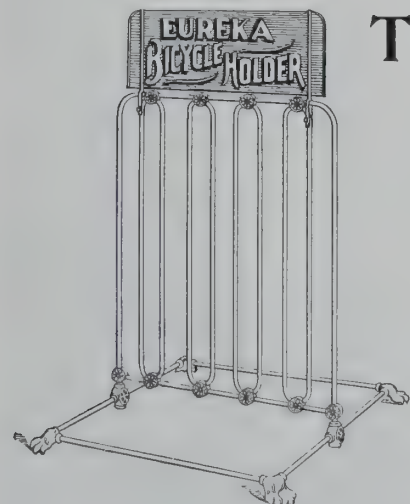
**G. W. COLE & CO., 111 B'way, New York, U. S. A.**

## The Eureka Bicycle Holder.

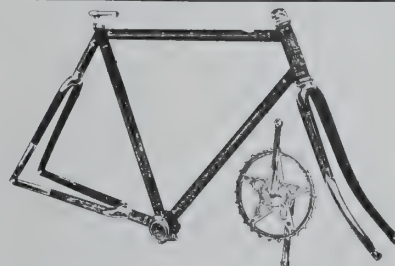
ALL IRON AND STEEL, combining strength, durability and neatness. Made with 5, 7 and 9 spaces, for lawns, indoors and sidewalk use.

SEND FOR CIRCULAR.

EXCELLENT MEDIUM FOR ADVERTISING.  
PRICES AND TERMS ON APPLICATION.



**OLIVER BROS., LOCKPORT, N. Y., U. S. A.**



**"THE FINEST ON EARTH."**

That's a broad claim to make for anything, but in the case of the

**MANSON 3 CROWN**

MODEL 33

it's but the simple truth, and there is no need to deviate from the truth.

**The Several Reasons Why?**

It is made of the very best material.

It is new and novel and eminently practical.

It has two rear crowns to match the front fork crown, causing the machine to be absolutely rigid.

It has an eccentric bracket at the hanger which facilitates the adjustment of the chain without using the rear chain adjusters, and is fitted with the one-piece Fauber crank.

The Thor Hubs are used and recognized everywhere to be the best.

The best swaged spokes, 14x16 size, are used.

Laminated or one-piece selected rock-elm rims.

1 1/4 or 1 1/2, 28-inch wheels, drilled 32x36.

The Peacock or Baldwin adjustable chain.

Head set, turned from bar steel, drop forging connections.

Seamless tubing throughout.

THE PRICES—\$75 less 33 1/3 and 5 per cent., delivered f. o. b. New York.

**MANSON CYCLE CO.,**

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Dunlap tires.

Steel adjustable handle bars.

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Record pedals.

Finest nickeling and enameling that can be put on a bicycle.

Frames, 22 and 24 in. high.

Weight complete, 24 lbs.

Choice of gear.

Ladies' frames are made same as gents, with exceptions of drop bar and chain guards.

Height, 20 and 22 inches.

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## PARIS EXPOSITION OF 1900.

## CLASSIFICATION AND ARRANGEMENT OF EXHIBITS.

THE vexed question of classification in the coming Exposition at Paris has been profoundly studied in all its aspects by M. Picard, the accomplished commissary-general, and by the superior commission. The difficulties—in fact, the utter impossibility—of devising a scheme of classification absolutely logical and entirely free from practical disadvantages were fully recognized. The commission examined with great care the classification of all the international expositions of the past, both in France and other countries, and considered fully the various criticisms to which they have been subjected in the light of the actual results achieved.

The post of honor is occupied by education, "the channel by which man enters into life, the source of all progress." Next come the works of art, and the third place is assigned to the instruments and general processes of letters, science and arts. Then come "the great factors of contemporary production, the most powerful agents of industrial achievement at the end of the nineteenth century"—the material and general processes of mechanics, electricity, civil engineering, methods of transportation. Next follow the exploitation and the products, superficial or subterranean, of the earth: Agriculture, horticulture, forestry, the chase, fisheries, placer mining, food stuffs, mines and metallurgy. Next in order are the decoration and furnishing of public buildings and habitations, threads, yarns, tissues, textile fabrics, wearing apparel, chemical industries, various manufactures. "Social economy, to which have been reserved the developments worthy of its actual rôle, follows naturally the various branches of artistic, agricultural and industrial production." It will embrace also hygiene and public or organized charity.

A new group has been created for the "moral and material work of colonization," and the series closes with the military and naval group.

In all departments of the Exposition, so far as practicable, materials and processes will be found in contact with products. All machinery will be operated under the eye of the public, so that visitors may familiarize themselves with its practical workings and follow the successive transformations of the crude material until it assumes the form of the finished article. Exhibitors will not be required, however, to expose methods and processes of fabrication an important element of whose value is their secrecy.

In so far as compatible with the vast extent of the Exposition grounds and the necessary dispersion of the exhibits among several main halls and the pavilions of different countries and of important exhibitors, the arrangement of the Exposition will be such that all the products of a single country will be brought into juxtaposition, as well as those of different countries pertaining to one class of industry. Thus, in proceeding in one direction the visitor may review successively the various exhibits of the United States or any other nation; proceeding in another direction he may examine successively all the exhibits from the different countries of one general class, such as agriculture, electricity, etc. But where it is not practicable, in arranging the Exposition, to consider both the nature of the products and their place of origin, the grouping will follow the nature, the destination and utility of the objects rather than the country of production.

The following shows the classification adopted, by groups and classes, those of greatest interest to our readers being given in detail:

GROUP NO. 1—*Education and instruction*.—Sections 1 to 6.

GROUP NO. 2—*Works of art*.—Sections 7 to 9.

GROUP NO. 3—*Instruments and general processes of letters, sciences and arts*.—Sections 11 to 18, including: (11) Typography, printing in general; (12) photography in two categories, viz, professional and amateur; (15) instruments of precision, coins, medals; (17) musical instruments.

GROUP NO. 4—*Materials and general processes of mechanics*.—(19) Steam engines; (20) engines using other motive power (except electricity); (21) general mechanical apparatus; (22) tools and implements of manufacturing.

GROUP NO. 5—*Electricity*.—(23) Production and mechanical utilization of electricity; (24) chemical electricity; (25) electric lighting; (26) telegraphy and telephones; (27) different applications of electricity.

GROUP NO. 6—*Civil engineering and transportation*.—(28) Materials and processes of civil engineering; (29) models, plans and designs of public works; (30) coach and cart building; (31) saddles and harness; (32) railway and tramway construction; (33) shipbuilding; (34) aërostation.

GROUP NO. 7—*Agriculture*.—Sections 35 to 42.

GROUP NO. 8—*Horticulture and arboriculture*.—Sections 43 to 48.

GROUP NO. 9—*Forestry, the chase, fisheries, cueillettes*.—Sections 49 to 54.

GROUP NO. 10—*Food stuffs*.—Sections 55 to 61.

GROUP NO. 11—*Mines and Metallurgy*.—(62) Materials and processes and

products of mines, ores and quarries; (63) materials and processes and products of large metallurgy; (64) materials and processes of small metallurgy.

GROUP NO. 12—*Decoration and furniture of public buildings and habitations*.—Sections 65 to 74, including: (68) Low-grade and high-grade furniture; (69) carpets, tapestries and other upholstery fabrics; (73) heating and ventilating systems and apparatus; (74) lighting apparatus other than electric.

GROUP NO. 13—*Threads, yarns, textile fabrics, wearing apparel*.—Sections 75 to 85, including: (75) Plants, materials, and processes of spinning and rope-making; (76) plants, materials, and processes of weaving; (77) bleaching, dyeing, printing, and finishing of textiles, plants, materials and processes.

GROUP NO. 14—*Chemical industries*.—Sections 86 to 90.

GROUP NO. 15—*General manufactures*.—Sections 91 to 99, including: (92) Cutlery; (94) jewelry; (95) clocks, watches, and other timekeepers

GROUP NO. 16—*Social economy, hygiene, organized charity*.—Sections 100 to 111.

GROUP NO. 17—*Colonization*.—Sections 112 to 114, including: (114) Special merchandise for exportation to colonies.

GROUP NO. 18—*Military and naval*.—Sections 115 to 120.

## Export Orders for 172 Locomotives During April and May.

A REPRESENTATIVE of the New York *Journal of Commerce* was recently informed by the Baldwin Locomotive Works that they had just received orders for 77 locomotives for the Trans-Siberian and Chinese Eastern Railroad. The order was received through the Russo-Chinese Bank as agents for the Russian Government. Of the total of 77, 50 are to be consolidated freight locomotives with tenders, while the remaining 27 will be tank locomotives. All are of the Vauclain compound system. The consolidated locomotives will weigh in working order about 70 gross tons.

In all the Baldwin people have booked export orders for 107 locomotives since the first of April, adding the foregoing to previous orders. This list includes an order for the locomotives for the Chinese Eastern Railway, 10 for New Zealand, 6 for the Robla Valmaseda, Spain, 5 (moguls) for the Egyptian Government, 2 for the Argentine Government and 1 for Mexico.

Another large contract that became known recently was received by the Richmond Locomotive and Machine Works by cable. It was an order from the Finland (Russian) State Railway for 17 compound locomotives. This order, with the 77 locomotives ordered from the Baldwins, makes a total of 94 fresh orders for the week, which, in view of the talk that the war is apt to interfere with export business, certainly makes a favorable week's business in the locomotive export line.

The week following the one in which this 77-engine order was received was also a good week for foreign trade for the locomotive works, export contracts having been closed for 48 engines. Of this number Japan ordered 43, Mexico 3 and South America 2. Of the 43 for Japan 26 were placed by the Nippon Railroad of Japan with the Schenectady Locomotive Works. These are to be of the mogul type and will weigh when completed 82,000 pounds each. Another order, which has been secured by the same builders, is for 12 locomotives of the consolidated type for the Kiushiu Railway, also of Japan; these will weigh about 94,000 pounds when completed. The Brooks Locomotive Works booked orders for 3 passenger and 2 side-tank freight engines for the Haukaku Railroad of Japan. The engines for Mexico were purchased by the Mexican railroad official in this market, while those of South America were bought by local export merchants, one being for Argentina and the other for Brazil.

All told, there have, as far as reported, been 172 locomotives ordered for export since April 1st. The companies from which they have been ordered and the countries ordering them may be summarized as follows:

## LOCOMOTIVES ORDERED FOR EXPORT SINCE APRIL 1ST.

Baldwin Locomotive Works—	
Chinese Eastern Railway.....	83
For New Zealand.....	19
For Robla-Valmaseda Railroad, Spain .....	6
For Argentina.....	2
For Mexico.....	1
For Egypt.....	5
Richmond Locomotive and Machine Works—	
Finland Russian State Railway.....	17
Schenectady Locomotive Works—	
Nippon Railway, Japan.....	26
Kiushu Railway, Japan.....	12
Brooks Locomotive Works—	
Haukaku Railroad, Japan.....	5
Other builders—	
For Mexican Railroad.....	3
For Argentina.....	1
For Brazil.....	1
Total .....	172

It is understood that a number of other important contracts are under negotiations, more especially for Russia and Mexico.



# BICYCLES!



## "ILLINOIS" BICYCLES.

Best bargains offered  
in Bicycles for 1898.

Spiral Screw Drivers.

Reversible Bit Screw Drivers.

One Hole Hand Corn Shellers.

Waffle Irons.

Serrated Edge Knives.

WE ARE THE WORLD'S HEADQUARTERS  
FOR THESE GOODS.

Paring Knives.

Mincing Knives.

Meat Tenderers.

Can Openers and Hardware Specialties.

SEND TO ANY EXPORTER IN THE UNITED STATES, OR TO US  
DIRECT FOR OUR 1898 ILLUSTRATED EXPORT  
SPECIAL, GIVING NET PRICES.

## ILLINOIS CUTLERY COMPANY,

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### THE

## Gem Water Motor Fan

Simple. Effective.  
Economical. Noiseless.

Novel in construction. As  
easily installed as an Electric  
Fan Motor.

LIST PRICE \$10.00.

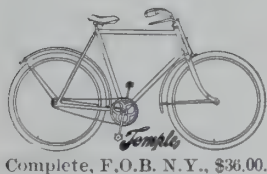
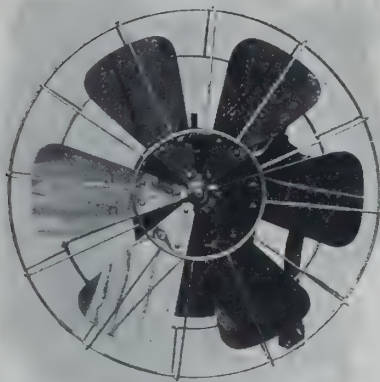
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Correspondence solicited.  
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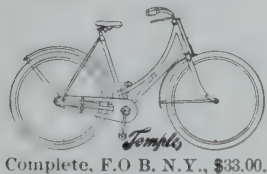
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Cleveland, O., U. S. A.

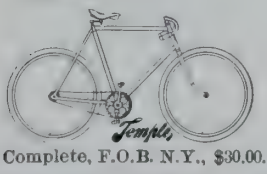
In ordering through export houses send  
duplicate direct to us.



Complete, F.O.B. N.Y., \$36.00.



Complete, F.O.B. N.Y., \$33.00.



Complete, F.O.B. N.Y., \$30.00.

## High-Grade Bicycles.

THE BEST	{ Ladies' and Gents' }	\$36	F. O. B. New York.
2nd BEST	{ Ladies' and Gents' }	\$33	F. O. B. New York.
3rd BEST	{ Ladies' and Gents' }	\$30	F. O. B. New York.

We also make a good Bicycle for \$21.60, for Ladies  
or Gents, with brake and guards, F. O. B. New York.

If you want Good Bicycles CHEAP

send your order to us. GOOD Bicycles cannot be  
made for less money. Catalogues and advertising  
matter furnished free.

We also make

TANDEM and JUVENILE  
BICYCLES.

RALPH TEMPLE CYCLE CO., 204 35th Street, Chicago, U. S. A.

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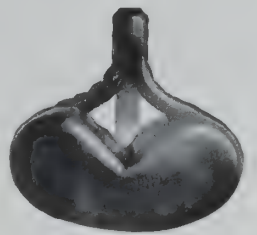


Designed with special regard for  
conformation to the human body  
in the sitting posture. Recom-  
mended by physicians.

Flat Coil Steel Spring.  
No Rebound.  
No Pressure on Soft Parts.  
Cool. Comfortable.

RETAIL PRICE, \$3.50.

Send for free descriptive  
circulars to



GLOVER CYCLE SADDLE CO., Jackson, Mich., U. S. A.

## The Wheeler Reform Saddle



never gets out of shape, fits the rider  
and keeps one free from saddle soreness.

Dealers never have them come back on their  
hands. Riders prefer them to all others. Endorsed  
by physicians and especially recommended for  
ladies. If your dealer cannot supply you, write

THE WHEELER SADDLE CO.,

195 Larned St., W., Detroit, Mich., U. S. A.

BUILT TO SIT ON,  
NOT TO STRADDLE.

In ordering through export commission houses,  
send us duplicate order. Catalogue free.

## BERKEY'S ADJUSTABLE

## Spring Seat Post

Solves the Problem.

No bicycle complete without it. It will prolong  
not only your own life, but life of your wheel.  
Lateral motion obviated by tightening screw. In  
ordering give exact size of seat post hole. Will  
fit any wheel and saddle. Send for circular and  
prices. In ordering through export commiss on  
houses send us duplicate order.



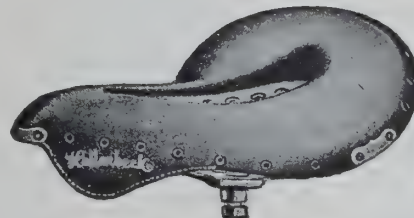
The Berkey Adjustable Spring Seat Post Co.

Grand Rapids, Mich., U. S. A.

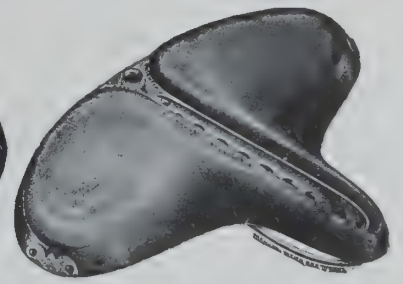
HOLLENBECK SADDLE CO., Successors to F. A. Hollenbeck & Co., Syracuse, N.Y., U. S. A.

Manufacturers and Exporters of

## BICYCLE SADDLES.



Orders filled through Commission Houses.  
Catalogue 3 on application.



Correspondence solicited.

## LENOX ANATOMICAL SADDLE.

"IT'S BUILT TO FIT."



FRONT VIEW,  
showing leather  
pad on steel  
base.

Two  
sizes:

Model C,  
8 1/2  
inches;  
Model D,  
10  
inches.



BOTTOM VIEW,  
showing steel base, coil  
spring and reinforce-  
ments.

## LENOX Specialties



are famous the world over for quality,  
durability and price.

SUNDRIES manufactured by us  
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Manufacturers, Jobbers and Dealers  
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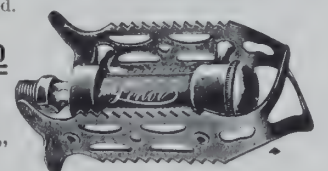
197, 199 and 201 Grand Street,  
New York, U. S. A.

Cable Address: "Lenox, New York."

Lenox Automatic Bicycle Bell.



Lenox Racing Saddle.





### How Steel Balls Are Made.

THE manufacture of the balls used in a wheel bearing is rather complex. They are made from round rods, some 20-1000ths larger than the required size. These are heated red hot on the ends and chopped off into nearly perfect spheres by peculiar dies. These are little grooves which are carved on circular disks, which move in opposite directions.

These grooves start from nothing on one end and attain their full size at their centre, after which their diameter is uniform. As the two points of these grooves come opposite each other the heated bar is thrust in and the ball is cut off and begun to be rolled, reaching its full size at halfway along the groove, after which it is simply rolled along.

When it appears it is perfectly round, with the exception of a little groove around it, which is left for fear too much metal should be taken into the die, which would give it a tendency to an oblong form. It is said, however, that a very perfect sphere can with care be turned out of one of these machines.

There is no use of this, however, as the diameter of the grooved part is 6-1000ths of an inch larger than a finished ball. From this cutting machine the rough balls are taken to the grinders, where they are put through two grindings with emery wheels, one coarse and the other fine.

The balls are put into a little metal runway just large enough to hold them in and let them protrude so that they will touch on the emery wheel below. This wheel is then set revolving in one direction and a metallic rim, which fits down into the groove which holds the balls and crowds them on the emery wheel, starts in the opposite direction.

The wheels go at a high rate of speed, and the hard metal balls revolving against the surface of the emery wheel send out a halo of sparks around the machine.

When the balls leave the first rough grinder they show very plainly its scratches on their surface, but after the course on the smoother stone their surface is very highly polished. A third course of grinding in emery dust and oil is necessary, however, before they are ready to be washed.

They are then sorted by being put into a hopper like that in an old-fashioned coffee-grinder, from which they run into a little slot between two pieces of steel, which is so graduated that the balls which differ a quarter of a thousandth of an inch in size are let fall into different compartments. They are then inspected and put into different drawers ready for use.

### An English View of the World's Iron Market.

THE London *Statist* inclines to the position, amply justified by its own carefully compiled statistics of pig-iron production and consumption in the United Kingdom, the United States and Germany, that England is likely, during the next year, to run a little short of that product and to depend mainly on the United States for her supply.

"There was a time," says the *Statist*, "when the Glasgow iron warrant market was regarded as an infallible barometer of the trade of the country. That time is no more, and, strange to say, the warrant market has even ceased to reflect the condition or to foreshadow the prospects of the iron trade itself. Those, therefore, who are molding their opinion of the trade from the daily or weekly movements in warrants will find themselves woefully astray. The circumstances of the time are such that if the speculative spirit which used to characterize the iron ring were still existent the price of warrants would be at least 10 shillings per ton higher than it is.

"This may seem a bold statement to make, but let us look at the facts. Last year the stocks in the three great producing centres of Scotland, Cleveland and Cumberland (which includes Northwest Lancashire) were reduced by 308,945 tons, though the make was increased by 37,284 tons. In Connal's stores in Glasgow, hitherto always regarded as the depot for the country's iron reserve, the stock at the end of December was only 337,489 tons. It has since been steadily dwindling, and is now only about 330,000 tons—not three months' consumption of Scotch iron in Scotland alone, not a fortnight's consumption of all the pig iron in the whole country. The stock of Cleveland iron in the warrant stores at Middlesborough is a mere flea bite—87,000 tons or so. And such is the run upon makers in Scotland for crude iron that we hear of pigs loaded into the wagons almost before they have time to cool. The dullness in the warrant market is, therefore, no index of dullness in pig iron, but is simply due to the absence of the speculative element. The outside public have found more attraction for speculative investment elsewhere than in iron scrip. This has made it comparatively easy for those to 'sit upon' the warrant market whose interest in finished iron is against any great or rapid rise in crude iron.

"The position of pig iron, however, is remarkably interesting, and a crit-

cal examination suggests some startling considerations. To appreciate the situation we must extend our views beyond Scotland—where, indeed, only about one-seventh of the British make is now produced—and survey the production and consumption of the whole kingdom.

"It is startling enough to find that the entire stock of pig iron distributed over the whole country is considerably less than the quantity in Connal's Glasgow stores alone from 1885 to 1889. Ten years ago Connal held no less than 1,244,433 tons of G. M. B. on warrants, and now has only about one-fourth of that quantity.

"The home consumption and exports of 1897 exceeded the whole output of the kingdom by close upon 500,000 tons. And the question which arises is whether, supposing the export demand this year to be equal to that of last year, we shall be able to supply our own consumption, even by absorbing the whole of the million tons now in stock. Do not let it be forgotten that, in addition to the 7,907,000 tons of Scotch and English iron, we last year also consumed 100,000 tons of American pigs.

"If the German demand is not abated we may reasonably assume that the exports of the current year will at least equal those of last. We admit that this cannot be taken for granted, and that the export item is the uncertain factor in the problem. But there is no reason to expect less than a normal demand all the year—not to speak of the infinite possibilities of China—and with even a normal demand for railway iron our consumption of pigs this year will greatly exceed anything ever yet seen.

"Can we meet it? Last year we had to take 314,000 tons out of stocks and 100,000 tons from America, to enable us to meet the home and foreign demand. The home consumption in 1897 was, in round numbers, about 600,000 tons more than in 1896, and the exports were 140,000 more. It is quite possible, therefore, that before the end of the year our present visible stock of a million tons will have disappeared and a pig-iron famine be in prospect.

"The total make of the world was never so large as last year. The following shows the comparative outputs of the three greatest producers in the world:

Years.	United Kingdom. Tons.	United States. Tons.	Germany. Tons.
1891.....	7,228,490	8,280,000	4,640,000
1892.....	6,616,890	9,450,000	4,911,240
1893.....	6,830,000	6,657,000	4,962,120
1894.....	7,364,745	7,124,500	5,345,630
1895.....	7,895,675	9,157,000	5,431,000
1896.....	8,565,503	8,500,000	6,360,980
1897.....	8,609,459	9,652,680	6,889,067

"The American make has been further increased since the beginning of this year. It is now at the rate of a million tons per month, and the total output for 1898 will probably exceed 12,000,000 tons. At first sight this suggests a large surplus for export, and as a matter of fact American pigs are still coming over to us—when suitable freight opportunities occur—in pretty much the same ratio as last year, while considerable quantities are being shipped direct from the States to the Continent. But competent authorities say that America has not yet developed her maximum requirements for iron and steel, and that when she does she will readily absorb the whole of this enormous output of pigs. And whatever comes out of the Cuban business, this is pretty certain—that it will create an era of iron shipbuilding in the United States such as never yet has been seen. The States, however, have not yet reached their maximum production of pigs, and it is quite within the range of probability that we may have some day, in the not very dim or distant future, to fall back on America to make good our deficient supply of crude iron—on America, once our largest buyer both of pigs and of finished material. No wonder the oldest men in the iron trade say that the experience of a lifetime affords them no guide in the new conditions which prevail in the world."

**American Bicycles in China and Japan.**—Five years ago no one would have regarded the Far East as likely to become an important market for bicycles, and it is only within the last two years or so that American manufacturers have exported bicycles to China and Japan. The use of bicycles in these two countries is largely restricted to resident foreigners, although they are gradually being adopted by the natives, but by very slow degrees. None but the high-priced wheels are sent there. Besides America, the only other country exporting wheels to the East is England. In 1896 the total value of bicycles shipped to Japan from the United States amounted to \$41,886. In 1897 it was \$80,874, or an increase of nearly 100 per cent. Our exports to China for the two years show even a greater increase. In 1896 the value of wheels sent there was \$11,278, and in 1897 it was \$26,300.





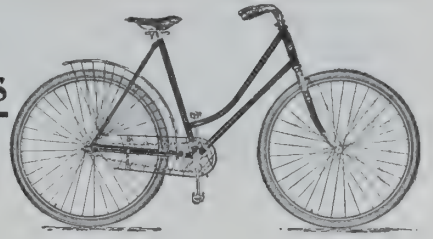
**Soudan**

## Nile and Pyramid Bicycles and Tandems

High-Class Bicycles for Export.

We want Agents in every country.

WRITE FOR SPECIAL ILLUSTRATIONS AND QUOTATIONS.



**THE SOUDAN MANUFACTURING COMPANY,** Successors to MASON & MASON CO.,

CABLE ADDRESS: "SOUDAN, CHICAGO."

CHICAGO, ILLS., U. S. A.

**— KNOCKED OUT —  
COMPETITION KILLED  
BY OUR PRICES  
GREATEST LINE OF BICYCLES ON EARTH  
THE AMERICAN BEAUTIES**

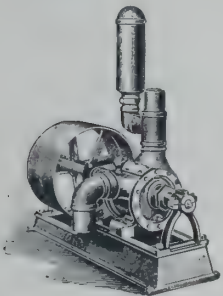
**10—MODELS—10**

**WINDSORS, NORTHFIELDS, WINFIELDS.**

Catalogues for nothing. Write for our confidential offer, which will surprise you.  
In sending orders through export commission houses send us duplicate order.

The BROWN-LEWIS CYCLE CO., 300 Wabash Ave., Chicago, Ill., U.S.A.

## CARLEY'S STEAM AND BELT ROTARY PUMPS.



They run at a slow motion,  
Have positive suction,  
Are very nearly noiseless and self-priming.

Valve can be removed without taking off heads or pulleys.  
Will pump more liquor at a less number of revolutions than any  
other pump on the market. WE GUARANTEE THEM. Send  
for Catalogue A. Correspondence solicited.

**CARLEY HEATER CO.,**  
OLEAN, N. Y., U. S. A.

ESTABLISHED 1870.

FOR BEST RESULTS

USE

## Baltimore Copper Paint.

It is Pure and Effective.

This paint is guaranteed to be a perfect protection to  
the bottoms of wooden vessels, for one year, when ap-  
plied as directed.

References Unlimited.

CORRESPONDENCE SOLICITED.

**Baltimore Copper Paint Co.**  
BALTIMORE, MD., U. S. A.



## The Universal Multi-Nebular Vaporizer

FOR OFFICE USE

IN THE TREATMENT OF ALL DISEASES  
OF THE

**RESPIRATORY ORGANS  
AND MIDDLE EAR**

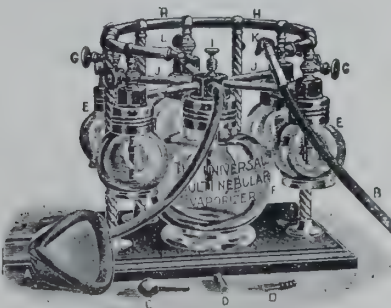
by Ten Different Methods, including

VAPO-PULMONARY MASSAGE and VAPO-AURAL MASSAGE.

IS INDISPENSABLE IN OFFICE PRACTICE.

Write for circular describing the instrument and methods of use.

**GLOBE MFG. CO., Battle Creek, Mich., U. S. A.**



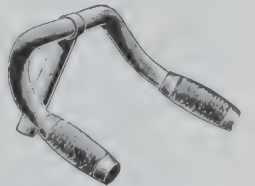
## BICYCLE HANDLE BARS.

Best Nickered over Heavy Copper.  
Made 7-8 Tube Tops.

PRICES, WITHOUT GRIPS, F. O. B. NEW YORK.



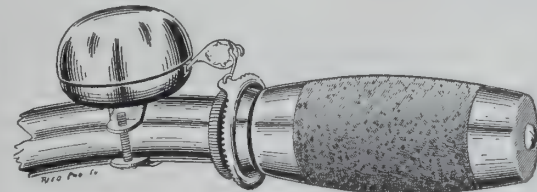
Upturned, one doz. lots ..... \$10.50  
Drop, one doz. lots ..... 10.50  
Octagon Tube, extra, per doz ..... 3.00  
"Schinner" Bars, extra, per doz ..... 1.20  
One-inch Tube, extra, per doz ..... 1.20  
Ram's Horn, one doz. lots ..... 11.50  
Adjustable, one doz. lots ..... 13.50  
Anti-Vibration, extra, per doz ..... 3.00  
Seat Posts, per doz ..... 3.60



Any size stems. Discount to the trade on 100 to 50,000 lots.

**Chicago Handle-Bar Co.,** 34 & 36 Market St.,  
Chicago, Ill., U. S. A.

## The Nei & Dean Bicycle Bell Ringers



are as handy as a pocket in  
a shirt. They are New, Novel,  
Practical, Durable and never  
fail to operate on the impulse  
of the moment. The instant  
the hand is on the Grip you  
have full control of the bell,  
thereby insuring safety and  
convenience. Can be used  
on any standard handle-bar

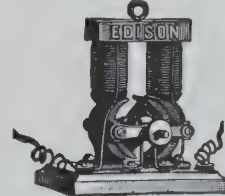
without the slightest change; is adjustable and strictly high grade, and the proper thing  
for bicyclists to have. In ordering goods through export commission houses send us a  
duplicate of order. For further particulars address

**NEI & DEAN, 419 Widdicomb Bldg., Grand Rapids, Mich., U. S. A.**

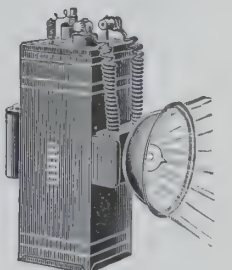
## The 3 Leading Electric Novelties.



Necktie Light.



Dollar Motor.



\$6 Bicycle Light. \$2.75

We undersell all on everything Electrical.

## OHIO ELECTRIC WORKS

CLEVELAND, OHIO, U. S. A.

HEADQUARTERS FOR ELECTRICAL NOVELTIES.

In ordering through export commission house send us duplicate order. Direct orders must be  
accompanied by draft on New York or San Francisco.

AGENTS WANTED.

CATALOGUES FREE.

## WOLVERINE MOTOR WORKS,

Grand Rapids, Mich., U. S. A.



Marine and Stationary Gas and Gasoline

## ENGINES AND LAUNCHES.

We manufacture Propeller, Side Wheel and Stern Wheel  
Launches. Send for Catalogue.





### Exports of Electrical Machinery and Supplies.

NO more striking illustration of the recent origin of the now great electrical industries of the United States could be found than the fact that the Statistical Department at Washington has not even yet corrected its methods of tabulation so as to deal satisfactorily with the facts regarding this rapidly growing export trade. To this day the Bureau of Statistics has one section of figures into which are lumped together the statistics regarding the widely diversified manufactures described by the following curious heading: "Instruments and Apparatus for Scientific Purposes, Including Telegraph, Telephone, and Other Electric." It is well known that the bulk of the exports grouped under this heterogeneous title are electrical supplies, and it is to be hoped that soon we shall have these important items sorted out from the rest. As it is, the exports covered by this heading have increased at an astonishing rate since 1885, when they were first tabulated at all. In that year they amounted to \$449,587; in 1890, to \$1,429,785; in 1895, to \$1,912,771; in 1896, to \$2,522,217, and in 1897 to \$3,054,453, or altogether an increase of no less than 579 per cent. in twelve years. The record for 1897 is being maintained, and 1898 bids fair even to surpass its predecessor and all former years.

Another tribute to the rapid expansion of our electrical exports is found in an altogether new table presented by the Bureau of Statistics for the first time in July, 1897, showing the exports of electrical machinery which had previously been hidden under the hopeless title of "other machinery." The complete tables as far as they have yet appeared regarding this interesting class of exports follow:

EXPORTS OF ELECTRICAL MACHINERY FROM JULY, 1897, TO MARCH, 1898.

July	August	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March
\$64,839	\$178,713	\$129,567	\$116,794	\$171,668	\$255,872	\$172,791	\$183,676	\$243,578

Altogether, the very important total of \$1,517,498 for the first nine months during which statistics on these exports have been published.

### Electricity for American Suburban Railways.

IT is true that the possibility of hauling long distance main line trains by electricity has hardly yet dawned above the horizon. Weight is not the difficulty, for on the Belt Line in Baltimore electric motors are hauling trains running up to 1,500 tons over heavy gradients with entire success from the operating, though perhaps not from the financial, point of view. Nor is there any question of speed. I was promised a ride at 70 miles an hour, had other engagements permitted. It is the infrequency of main-line service which makes electricity commercially, though not physically, out of the question. But suburban traffic demands before all things frequency of service, and here electricity is coming to the front with very rapid strides. I speak not merely of what they call in the States "street railways," though of these there are now over 15,000 miles in existence, with, in many cases, continuous routes of 50 miles and upwards in length, over which cars run at speeds of 20 and 30 or even 40 miles an hour. But the various "elevated" lines in Chicago are already for the most part electrically equipped, and those of Brooklyn are, I believe, following suit.

But the company which has done most in this direction is the New York, New Haven and Hartford, commonly known nowadays, from the rapid series of absorptions of rival or tributary lines which it has effected, as the "Consolidated" Road. At two points on this system, Nantasket and Hartford, steam locomotives are only retained for the goods and through passenger services, the local passenger service being wholly worked by electricity. The current is carried directly by a third rail laid between the two ordinary rails, and there are no feeder cables. Yet even at a distance of, in one case, 13 miles from the power house there is no perceptible loss of current. On the 9 mile stretch between Hartford and New Britain there used to be in all twenty-three passenger trains a day, and the fare was 23 cents. There are now—not counting the through trains—seventy two local trains, on which the fare is 10 cents. But as the number of passengers has quadrupled, while working expenses have actually decreased, the company has gained by the change almost as much as the public.

The third rail, which is shaped much like a ridge tile and weighs 100 lbs. to

the yard, rests, with no other insulation, on wooden blocks, and is kept in position by its own weight. The cost of laying it was about £600 per mile. At first there was considerable question as to the danger of a rail charged with a current of 600 volts, but in practice no serious accident has happened, and chancing myself to be passing through New Britain at noon, just as the whole population of the town was pouring out of the schools and factories, I had occasion to notice, by the manner in which men, women and children strolled, in the usual happy-go-lucky American fashion, across and along the "tracks," that of this particular danger familiarity had very soon bred contempt.

So great has been the success of the Hartford experiment that the management of the Consolidated Road have practically decided to introduce electricity on the same system on a suburban service between Boston and Dedham, by which, at present, some 5,000,000 passengers per annum are carried. The company is now building in Boston a new terminal station—the largest, it is believed, in the world—in which the main line service will be dealt with in ordinary fashion, while suburban electric trains—the carriages constructed, it is interesting to note, after English patterns, with separate compartments and side-doors—will run in underneath at a lower level, and, passing round a loop, run out again, without ever stopping to change engines, after only a few seconds' delay.—W. M. Ackworth, in the *London Times*.

### A Successful Failure.

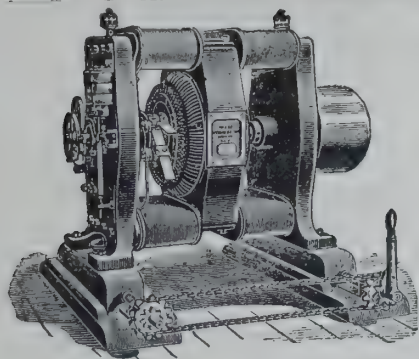
A RATHER amusing incident took place several months ago in the yards of the Chicago Ship Building Company, which showed how a piece of electrical apparatus could be at once both a success and a failure.

The Chicago Ship Building Company, which has extensive yards for building lake vessels on the Calumet River at South Chicago, has, like all progressive concerns of the kind, introduced compressed air and electricity wherever possible in the process of ship construction. It has a power house in the centre of the yard where the dynamos and air compressors are located. One of the important uses of compressed air is for driving pneumatic hammers for deck caulking on iron decks. In this process the hammer is fitted with a sharp tool, which is made to follow the flush joint between the two plates and burr the corners over so as to make a water-tight joint. This was formerly done with a hand hammer, and the workman held the tool in one hand and hammered with the other. When the pneumatic caulker was first introduced the workmen saw in it one of those much to be shunned devices to enable one man to do the work formerly done by five or six, and they immediately discovered that it was impossible to follow a seam with a pneumatic caulker and that the tool wandered all around the adjacent plate in a most unaccountable manner. As there was no opportunity to fasten a guide to the smooth deck by a mechanical clamp, the management of the yard was in somewhat of a quandary until the company's electrician came to the rescue with a magnetic clamp furnished with a guide, which could be set anywhere on the deck and would hold fast as long as the magnets were excited. When this was given to the workman with the pneumatic caulker he, of course, found no difficulty in following the seam because he had a straight edge to guide him. The remarkable part of the proceeding followed, however, when the workman further found he could follow the seam without the aid of a straight edge and magnetic clamp and didn't care to bother with the clamp. The consequence is that the clamp now resides in the scrap heap; but who will say that it did not accomplish a useful object and surmount an obstacle, even if that obstacle was the objection of workmen caused by opposition to labor-saving devices?

**Our Phenomenal Foreign Trade.**—If our exports during May and June only amount to the same sum as they did one year ago (those of April exceeded a year ago by 28 per cent.) the sum total of our export trade will reach fully \$1,176,000,000 against a total of \$1,050,000,000 a year ago. If, on the other hand, the months of May and June this year should show a gain over last proportionate to that already shown in the ten months' period (14 per cent.), the total volume of our exports will be little below \$1,200,000,000; and again, if the gains shown in April this year over last are maintained to the close of the fiscal year in June, the total exports for the present fiscal year will exceed those of last year by nearly 160,000,000.—*Bradstreet's*

**Exports of Paper.**—In March last, according to the Treasury returns, the United States exported paper and manufactures thereof to the value of \$510 161, against \$306,109 for the corresponding month in 1897. Of this amount \$248,234 was printing paper. For the nine months ending March, 1898, our paper exports amounted to \$4,098,755, against \$2,215,217 for the same period in 1896-7, an increase of nearly 100 per cent.





## FORT WAYNE ELECTRIC CORPORATION,

Foreign Dept.: 115 Broadway, New York, U. S. A.

Factory: Fort Wayne, Ind., U. S. A.

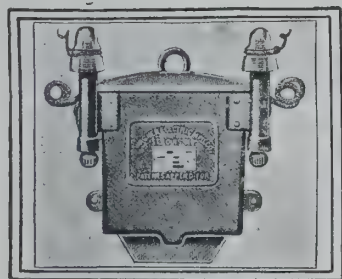
MANUFACTURERS OF

## Electric Lighting and Power Apparatus,

### "WOOD" SYSTEMS

Of Arc, Direct Current and Alternating Incandescent Lighting, and Power Transmission.

Estimates furnished on receipt of specifications.



We have courted and ENCOURAGED

COMPARATIVE TESTS, knowing that our Competitors alone had cause to fear them.

REMEMBER, EFFICIENCY AFFECTS YOUR COAL PILE

The Cheapest Transformer is sure to prove the most expensive in the end

**WAGNER ELECTRIC MANUFACTURING CO**

GENERAL OFFICES AND FACTORY, ST. LOUIS, U.S.A.

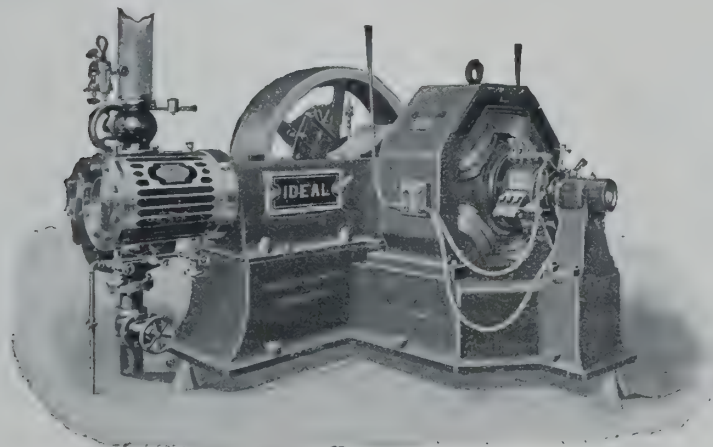
WHEN WRITING US MENTION "THE AMERICAN EXPORTER."

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ALTERNATING CURRENT,  
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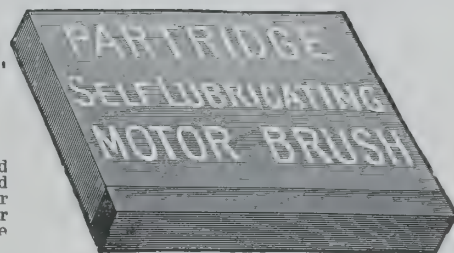
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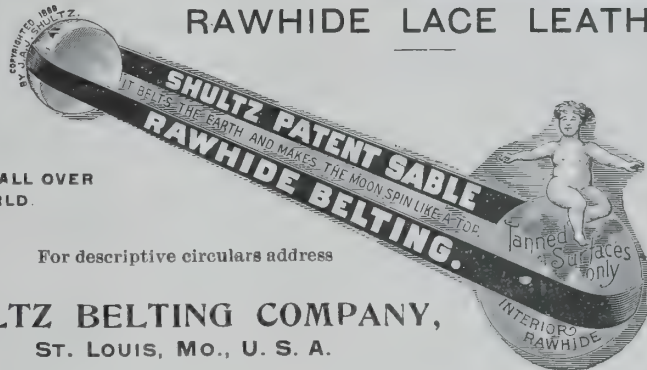
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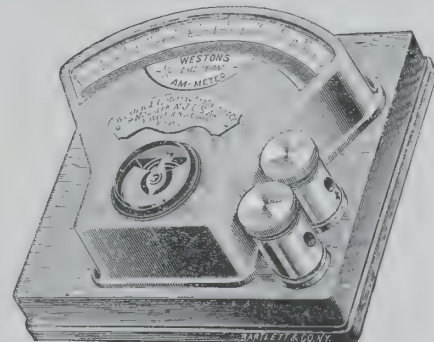
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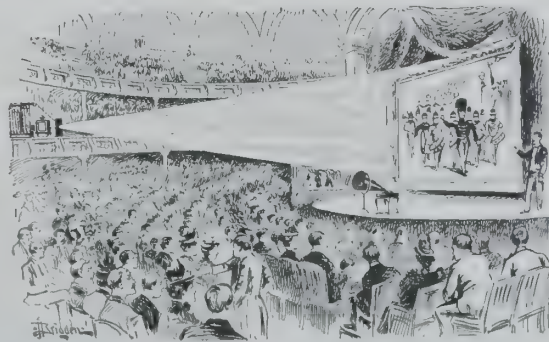
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graphs, Records, Supplies, Kinetoscopes, Kinetophones, Projectoscopes, Films, X-Ray Apparatus  
Battery Fan Motor Outfits, Lalande Batteries, Electro Dental and Surgical Outfits, etc.



### Electric Power for Manufacturing.

THE practicability of electric transmission from distances up to perhaps twenty-five miles cannot any more be questioned. There are at present in the United States a large number of plants varying in size from 1 to 5,000 horse-power, which are daily transmitting power over considerable distances and giving good service with a reasonable expense for maintenance. One of the principal questions of interest to the manufacturer to day is, whether or not by the adoption of electric devices in one form or another he can effect a saving in driving the machinery in his mill. In some cases, under great pressure from manufacturers of electric instruments, plants have been installed and the results have been disappointing. The electric motor has its place, and if properly designed and installed under conditions for which it is adapted it always proves a factor of economy to the total cost of operation. For short distances there is no objection to a mechanical drive, and when the power could have been transmitted direct with but a small loss, it is absurd to attempt to effect a saving by transforming power already existing in the form in which it is to be used into electricity and then transforming it into power again. Theory teaches that there must be some losses by these changes. This objection to electric transformation holds good only in cases where electricity is used as a medium for transmitting power in bulk over short distances, say from the prime mover, in whatever form it may exist, to lines of connecting shafting, which are in turn used to drive individual machines.

From a careful showing and tests it appeared that in a stamping mill the power required to overcome friction amounted to more than 60 per cent. of the entire work done. Other instances of large friction losses were also cited. The recent forms of alternating current induction motors which have been perfected possess several decided advantages over the direct current type of machine, but they are still to some extent experimental, like all other new apparatus. They are simple in construction, and consequently less liable to injury and breakdown, and have no commutator, which is one of the principal sources of trouble in the direct current machine. They also possess advantages in starting, and stopping especially in starting under heavy loads.

Electric transmission can be used to advantage with standard forms of machines as follows: First, where a large water power is available at a considerable distance from the mill which is in need of more power than can be obtained from the water privilege at the mill itself; second, where owing to the separation of the mill buildings, or peculiar local requirements, it is desired to transmit power further than can be done by belting in order to avoid the installment of individual steam plants in each building; third, where small water privileges are available at various points on a stream, but in order to become useful the power must be concentrated at one point without too great expense for maintenance of the individual parts of the system; fourth, where for various reasons in securing a mill site it is desirable to locate at a considerable distance from the source of power on account of the fact that the land immediately adjacent to the privilege is not suitable for location; fifth, where for special reasons it is important to do away with shafting throughout the mill.

Admitting that power can be transmitted satisfactorily, the next point is as to the economy of this electric transmission. In the cost of a water privilege at a distance, where the problem is to transmit power in bulk for a few thousand feet or more, the practical question is simply one of cost of power delivered on the ground by steam. The cost of power delivered to the motors, of course, depends upon the value of the water privilege, its cost to electrical apparatus, size of unit in which power is required and local conditions.

### The Electrical Equipment of a United States Government Arsenal.

THE mammoth gunshops of the United States Government at Watervliet, N. Y., are now being rushed night and day on the completion of a large number of 8-inch, 10-inch and 12-inch built-up guns, and the preliminary work for a number of 16 inch guns, the latter being the largest ever built in the world. Two ten-hour shifts of men are at work seven days in the week.

The current for lighting the shops, and, in fact, the whole of the yard, is supplied by two independent power plants, duplicates of each other. Each of these plants consists of two 100 kw bipolar 250-volt generators, worked either singly or in multiple with each other on 250 volt circuits. One plant is belt driven from water wheels, in what are known as the lower shops, the other belt-driven from the main engines of the mammoth gunshop. The prime movers of either shop in case of emergency may be shut down, and the shafting

and machinery of the adjoining shops motor driven up to the capacity of the machines by power derived from the other plant, the possibility of effectively doing this being the reason for the adoption of 250-volt dynamos instead of 125-volt, on the three-wide system.

For obtaining a balance on the lighting circuits, two small bipolar 125-volt equalizers of about 15-horse-power each are coupled together and connected in series across the mains, one such pair being installed in each dynamo-room. These equalizers are only used when the lighting circuits are on. The same generators supply current to the crane equipment of the gunshop. This shop is by far the largest in this country, and is divided into one main and two side aisles, almost a quarter of a mile in length.

An idea of the magnitude of the work undertaken here can be obtained from the fact that the cost of the main gun plant is over \$5,000,000. The north end of this shop is served by two mechanically driven cranes fitted with the usual square shafts, the south end being fitted with two electrically driven cranes. The heavier of these has a capacity of 120 tons and is operated by one motor of about 80-kw capacity. The later and newer crane of 60 tons' capacity is driven by four motors. On the 60 ton crane, one motor drives the bridge longitudinally up and down the shop; another drives the trolley laterally across the bridge and shop; another, located on the trolley, operates the auxiliary 15-ton hoist, and the fourth operates the main 60-ton hoist.

The original main hoisting motor having been found to be too small for the heavy load and the considerable friction of the powerful reduction train, a heavier motor has been supplied. This is a four-pole machine, with cast-steel yoke and laminated steel "cast-in" pole pieces, capable of delivering about 75-horse-power when running at 600 revolutions per minute. The machine is series wound, with a small "teaser" shunt winding to prevent its running away and to give an initial field excitation. The motor is controlled from the operating platform under one end of the crane bridge. The motor works both on hoisting and lowering, the speed being controlled in the former case purely by a variable resistance in the armature circuit, and in the latter case by a combination of resistance and the use of a magnetic brake, the pressure of which can be adjusted by resistances inserted by the same controlling lever that controls the motor rheostat. In this way a slow speed and perfect control is obtained, no matter what the downward pull of the load may be. The casting of the lower half of the field ring of the motor to fit into its cramped position on the crane was no easy task, but was successfully accomplished after four castings had been lost and the steel works had refused to try again.

Power is supplied to the cranes by a row of trolley wires laid loosely along on top of the main supports and resting normally on insulators. Under-running trolley slides pick up these wires and raise them above the insulators as the crane comes along. The wires from the controlling platform to the trolley (eleven in number) are stretched along the inner sides of the bridge girders, the contacts connected to the trolley bearing upon them. These cranes are used for handling the heavy guns and the mammoth machines used in constructing them and also to manipulate the loads in the furnace and assembling or shrinkage pit in the centre of the shop. Here the jackets of the big guns are raised to the proper heat in a furnace, beside which the main forging of the gun is placed vertically on its breech. The jacket is lifted out by the crane and lowered down, while hot, over the central tube, on to which it shrinks tightly in cooling. The latter process is hastened by streams of water directed at the hot jacket from all sides. The raising and lowering of these jackets is an operation requiring extreme delicacy in the control of the cranes. It was difficult to obtain this absolute control with a small high-speed motor and an ordinary starting rheostat, but with the large low speed motor and the special controller the work is handled with great accuracy.

The lighting system is quite extensive. There are about 200 50-cp. outdoor lights, beside the following buildings: Large gun factory, small gun factory, cabinet and carpenter shop, machine shop where shells are made and general repairs are attended to, iron foundry, bronze foundry, blacksmith shop, ordnance storehouses, quartermaster's stores, hospital, barracks, married soldiers' cottages, non-commissioned officers' dwellings and eight officers' residences.

The three new lathes they have just installed are the largest ever made in this country, and their cost, set in position, of over \$50,000 each, will give the reader some idea of the magnitude of the shops, as \$50,000 will start quite a machine shop in itself. The next size smaller lathe, of which there are twenty or more, costs about \$30,000 each. The large machines are at work on the 16-inch guns, which will weigh 120 tons each.

—The Walker Co. of Cleveland, Ohio, has received an order for an electric railway equipment from Singapore.



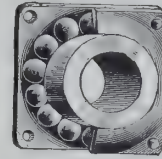
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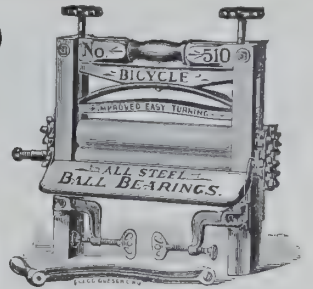
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Send for Catalogue.  
Special attention given to export orders.  
Correspondence solicited in any language.



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**SPEARE'S CROWN COLD WATER PAINT****The Original Fireproofing and Waterproof Paint.**

When combined with cold water makes the finest paint on earth. Especially adapted for out-buildings, private residences, factories, breweries, tanneries, stables, fences and cellars. Its fireproofing and waterproof qualities make it especially valuable for manufacturing establishments and large buildings of every description. Comes in powder form, in white and colors. Orders filled through commission houses. Send for color card, free sample and catalogue "1." Goods sold under absolute guarantee not to peel, crack or wash off. In ordering specify whether wanted for inside or outside use.

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**COULD'S STEAM AND WATER PACKING.**

Patented June 1, 1880.—The Original Ring Packing.

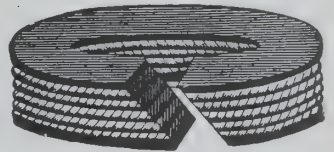
**IN ORDERING, GIVE EXACT DIAMETER OF STUFFING BOX AND PISTON ROD OR VALVE STEM.  
SELF-LUBRICATING, STEAM AND WATER TIGHT.**

Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. EVERY PACKING FULLY WARRANTED.

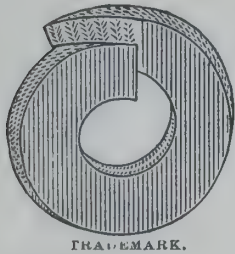
N. B.—This packing will be sent to any address, and if not satisfactory after a trial of 30 days, can be returned at our expense. None genuine without this trademark and date of patent stamped on wrapper. All similar packings are imitations and calculated to deceive.

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SEND FOR SAMPLES.

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Made in 16 sizes.

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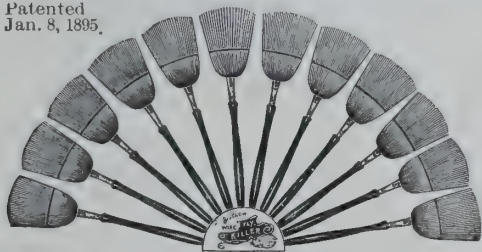
**FINE SHOE TOOLS**

FOR EXPORT TRADE.



Orders filled through commission houses.

Correspondence solicited. Catalogue "S" on application.

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Jan. 8, 1895.**THE WIRE FLY KILLER.**UNIVERSALLY USED ALL  
OVER THE WORLD.

Unsurpassed in houses, Stores, Etc. Does not crush the fly.  
Does not soil the most delicate wall paper or ceiling.

Orders filled through Commission House.

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J. F. BIGELOW, Manufacturer and Exporter,

Correspondence Solicited.

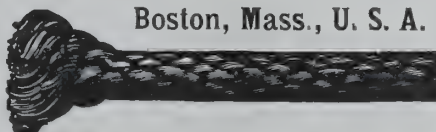
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**SILVER LAKE COMPANY,** THE ORIGINAL MANUFACTURERS OF**Solid Braided Cordage.**

WINDOW SASH CORD, } COTTON, LINEN OR  
RAILROAD BELL CORD, } ITALIAN HEMP.  
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THE BEST IS THE CHEAPEST.



CLOTHES LINES,

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STEAM PACKINGS, SILVER LAKE &amp; MILLER SOAPSTONE PACKING.

Send for Samples.

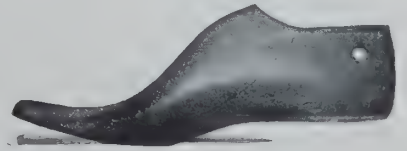
**S. PORTER & CO.**

Manufacturers and Exporters of a

Full Line of Men's,  
Women's and Children's**LASTS.**

Orders filled through Commission Houses.

Correspondence solicited. Worcester, Mass., U. S. A. Catalogue "B" on application.





## New Catalogues.

*These catalogues may be had free of charge on application to the firms issuing them. Please mention the AMERICAN EXPORTER when you write.*

THE FRANK MILLER COMPANY, 349 and 351 West 26th street, New York, U. S. A., have sent us an admirable pocket map of Cuba, showing more names of places likely at any moment to be famous than any other we have yet seen.

THE KEYSER MANUFACTURING COMPANY, Chattanooga, Tenn., U. S. A., have just sent us a new catalogue of their "Odorless" refrigerators similar to the one noticed in this column a short time ago but printed in the Spanish language.

W. F. & JOHN BARNES COMPANY, Rockford, Ill., U. S. A. Price lists and descriptive catalogues of wood-working and of metal working machinery. (Separate.) The former gives illustrated descriptions of a great variety of drills, lathes, emory grinders, lathe tools, chucks, etc.; the latter of a large line of wood-working machinery, including circular saws, scroll saws, mortising, tenon ing and molding machines, lathes, etc.

THE MCCRAY REFRIGERATOR AND COLD STORAGE COMPANY, Kendallville, Ind., U. S. A. Catalogue No. 30, describing their family and apartment house refrigerators, larger styles for meat markets, club houses, fine residences and public institutions, together with a line of butter and cheese roll top refrigerators. Catalogue No. 30 describes refrigerators and cold storage rooms for hotels and public institutions.

THE GEO. L. SQUIER MANUFACTURING COMPANY, 418-428 Niagara street, Buffalo, N. Y., U. S. A. Catalogue of filters and water purifying apparatus for schools and household use. Contains matter of great interest and importance to all who are in charge of public institutions and to mill owners and others who desire to safeguard the health of their employees. Illustrated.

HENRY R. WORTHINGTON, Hydraulic Works, Van Brunt and Rapelyea streets, Brooklyn, N. Y., U. S. A. Catalogue of electric and power pumps. This catalogue contains only a few of the many types of pumps manufactured by this firm, those selected being the most widely used. Illustrated.

THE GORDON BURNHAM BATTERY COMPANY, 82-86 West Broadway, N. Y., U. S. A. Catalogue and price lists of storage batteries for both closed and open circuits, with a great variety of cells, bell and telegraph outfits, fan motors, etc.; also a large line of electro-therapeutical apparatus. Illustrated.

RIFE'S HYDRAULIC ENGINE MANUFACTURING COMPANY, 126 Liberty street, New York, U. S. A. Catalogue and circulars describing the Rife automatic hydraulic engine. Illustrated and containing numerous testimonials.

JAMES LEFFEL & Co., Springfield, Ohio, U. S. A. Catalogues of turbine and cascade water wheels, profusely illustrated, and covering a wide variety of types and sizes. In addition to much interesting matter regarding notable plants equipped with Leffel wheels—such as a plant at Niagara Falls of six giant turbines, two of 2,400 horse power each, and one at the Falls of Juana-catlan, Mexico, where 1,700 horse power are generated and transmitted seventeen miles. These catalogues contain elaborate sets of tables and instructions for estimating head, flow, etc.

THE MOLINE PLOW COMPANY, Moline, Ill., U. S. A., have just sent us a bright little game published by them, entitled "Fun for Fifty Evenings," or "Hank Knowit." It consists of fifty-one cards in all colors of the rainbow, together with a story and directions for playing, done up in a neat package. The company write us that the games can be had for the asking by addressing them. (Room M.)

**Exports of Horses.**—The Department of Agriculture is now at work collecting information concerning the exact character of horses best adapted to the requirements of the principal European markets. Germany, the United Kingdom, France and Belgium, during the calendar year of 1896, imported 210,323 horses valued at \$33,119,125. Of this number only 24,813, valued at \$3,717,748, or a little over one-tenth of the total, came from this country, notwithstanding the fact that it has so many natural advantages for raising superior horses on a large scale. It is expected that the information being collected will make it possible to conduct the exportation of American horses in a more intelligent and successful manner.

**Building Locomotives for Spain.**—There are in course of construction at the Baldwin Locomotive Works six locomotives for the Robla and Valmaseda Railroad in Spain, a road that runs near the Seville and the Alhambra, through some of the most picturesque scenery in Europe. The contract provides for the completion of the engines by July, and it is stated at the works that they will be ready by that time. They will be shipped in some steamer flying a foreign flag, and the firm expects no trouble in delivering them.

## Export Notes.

—The Brown Hoisting and Conveying Machine Co. lately shipped three standard ore bridges to Manopol, Russia, and has just received an order from the same place for eight more. The company recently finished a Government contract for the fitting up in Dry Tortugas and Key West of extensive coal-handling plants.

—There is a growing demand in Germany for American-made shoes of medium quality.

—The H. C. Frick Coke Company has received a contract for 30,000 tons of coke from the Tampico (Mexico) smelters.

—The Tennessee Coal, Iron and Railroad Company is making heavy shipments to Stockholm, Liverpool and Genoa, while orders and inquiries from all over Europe are more active than at any time in many months.

—The E. P. Allis Co., Milwaukee, is working on power plants for street railways at Barcelona, Madrid, Dublin, Buenos Ayres and Berlin, and a 900 horse-power cross compound engine for Ludwig, Loewe & Co., of Berlin, for their factory.

—Germany imports more American bicycle saddles than any other European country.

—The Pope Manufacturing Company, Hartford, Conn., reports large sales of bicycles in European cities, especially to German and Austrian firms. A Vienna firm has been supplied with \$500 worth, a Bremen firm with \$2,500 worth, several Hamburg firms with \$16,000. Buenos Aires has bought \$6,000 worth and Budapest \$1,200 worth.

—The Toledo Machine & Tool Company, Toledo, Ohio, has recently shipped a consignment of heavy power presses to London, England, and has inquiries for heavy machinery from Calcutta, Venezuela and Austria.

—The Philadelphia Engineering Works have recently shipped to the Rincon y Anexas mines of Temascaltepcas, Mexico, a pumping plant of 700 gallons a minute capacity.

## Electric Railways in Europe.

"L'INDUSTRIE ELECTRIQUE" has recently published some very interesting statistics regarding the electrical-railway service of Europe which we take the liberty of translating and presenting to our readers in connection with the editorial on "The Electric Railway Revolution" on another page:

ELECTRIC "TRAMWAYS" IN EUROPE.

Country.	Length of Lines—		Cars in Use—	
	Jan. 1, '97.	Jan. 1, '98.	Jan. 1, '97.	Jan. 1, '98.
	Kilom.	Kilom.		
Germany .....	642.69	1,138.20	1,631	2,493
France .....	279.36	396.80	432	664
Switzerland .....	78.75	146.20	129	237
England .....	109.45	134.40	168	220
Italy .....	115.67	132.70	289	311
Austria Hungary .....	83.89	106.50	194	243
Belgium .....	34.90	69.00	73	107
Spain .....	47.00	61.00	49	50
Russia .....	14.75	30.70	48	65
Norway Sweden .....	7.50	24.00	15	43
Ireland .....	18.00	22.80	32	32
Servia .....	10.00	10.00	11	11
Bosnia .....	5.60	5.60	6	6
Roumania .....	5.50	5.40	15	15
Holland .....	3.20	3.30	14	14
Portugal .....	2.80	2.80	3	3
Total .....	1,459.03	2,259.30	3,100	4,514

The systems employed are thus summarized:

	1897.	1898.
Overhead trolley .....	122	172
Underground trolley .....	8	8
Third rail .....	8	8
Storage battery .....	12	13

From this it appears that the overhead-trolley system, which is perhaps the most distinctively American of any, although all are used here, is gaining far more rapidly than any other.

## Important Railway Concession in China Secured by Americans.—

The American China Development Company has obtained a concession from the Chinese Government to construct a railroad from Hankow to Canton, 900 miles. The contract with the syndicate was signed by the Chinese Minister in Washington, April 14th, and ratified by an imperial edict April 28th. The syndicate must furnish \$20,000,000 for building and equipping the road. Also \$25,000,000 more must be provided for other lines which are being negotiated for. The Government of China guarantees 5 per cent interest. Fifty-year gold bonds are to be issued, and after their payment the road will belong to the Government. W. A. Bash, a representative of the syndicate, will be in New York for some days securing engineers and constructors to accompany him to China. He will negotiate for 350 locomotives, 2,000 cars and 200,000,000 feet of lumber.



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Mass., U. S. A.

MANUFACTURERS AND EXPORTERS OF

**Whiting's "Ratchet-Action" Wrenches.**Sold direct or through export commission houses.  
Correspondence solicited. Circular E on request.**Fine Saddlery Hardware for EXPORT.**

Orders filled through Commission Houses. Correspondence solicited. Catalogue "B" on application.

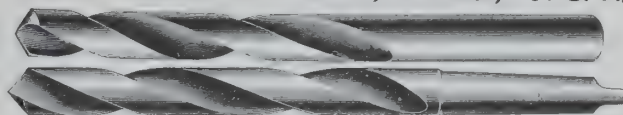
**NASHUA SADDLERY HARDWARE COMPANY,**  
NASHUA, N. H., U. S. A.Harness Saddle Trees (in iron), Gig, Track,  
Coupe, Express. All styles and sizes.Harness Saddle Mountings, such as Terrets,  
Check Hooks, Etc., Etc. All Patterns.

Brass, Nickel and Imitation Rubber Finish.

**STRANGE FORGED DRILL AND TOOL COMPANY,**

Manufacturers and Exporters of

NEW BEDFORD, MASS., U. S. A.

**THE ONLY  
Forged Twist Drills**  
Made in the World.**Also Chucks, Rose Reamers and Machinists' Tools.**

Orders filled through Commission Houses.

Correspondence solicited Catalogue "A" on application.

**THE HANDY.**

TRADEMARK.

**SHEEP SKIN MITTEN,**Acknowledged to be the best article for **POLISHING STOVES**, as it does away with the old-time dirtiness of the work, making this work a pleasure. Also invaluable for polishing brass or glass, or silverware which it does not scratch. For tan shoes and cleaning bicycles it has demonstrated itself a conspicuous success.

620 Atlantic Ave., Boston, Mass., U. S. A.

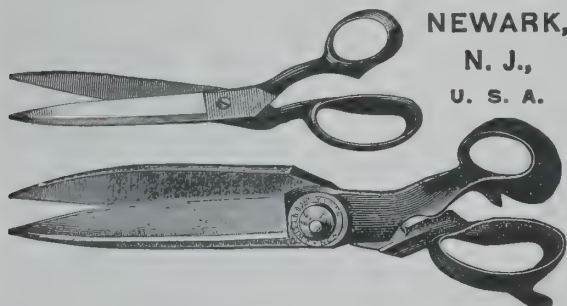
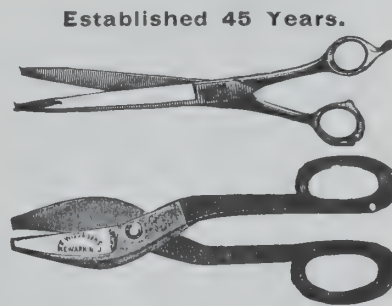
**DIAMOND HARDWARE CO.****EVAN LEIGH & SON,**

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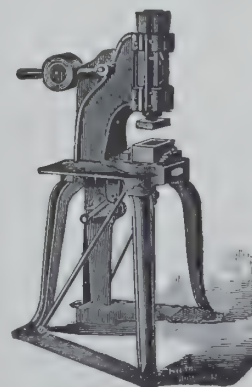
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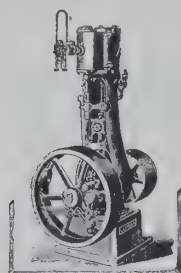
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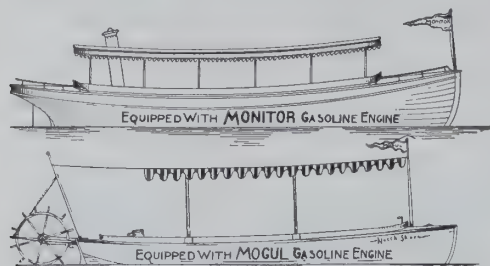
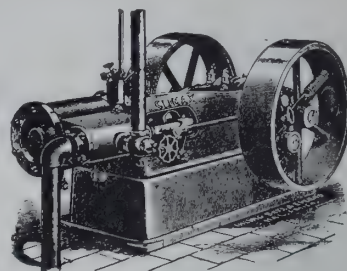
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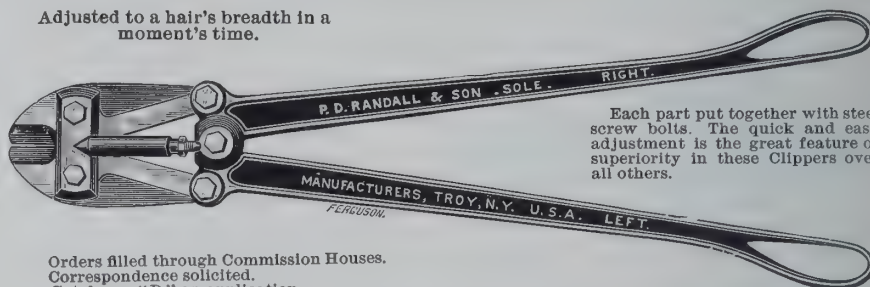
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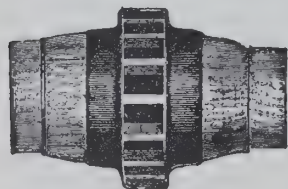
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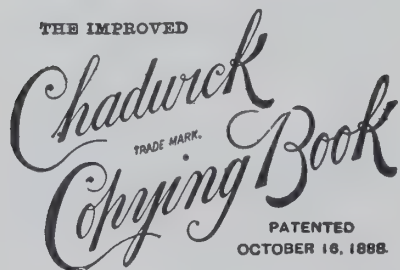
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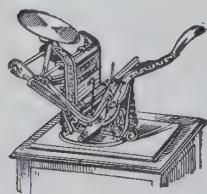
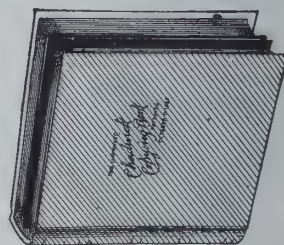
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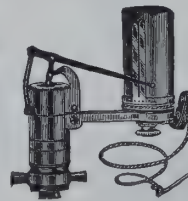
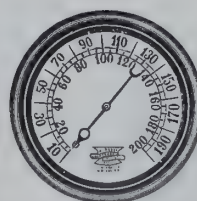
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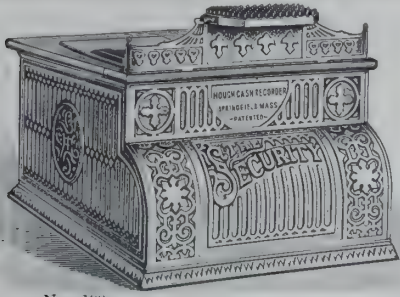
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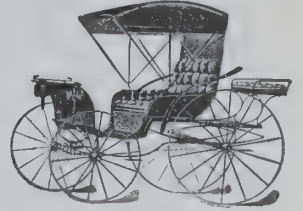
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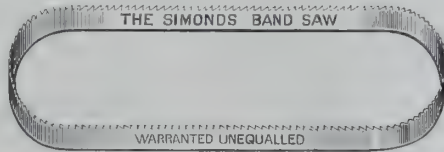


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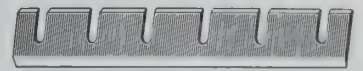
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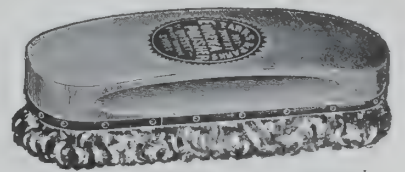
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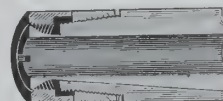
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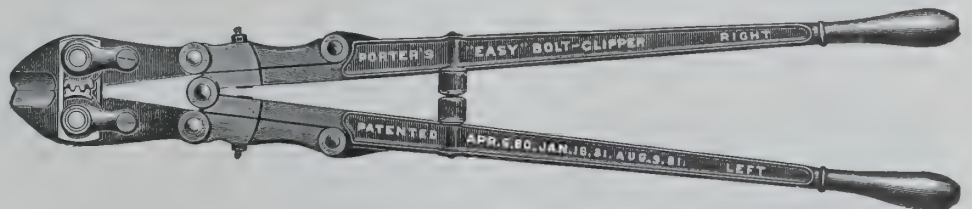
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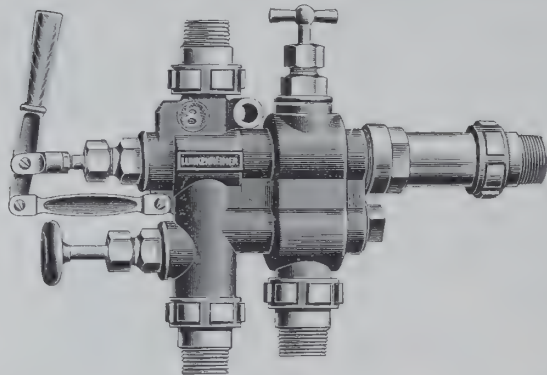
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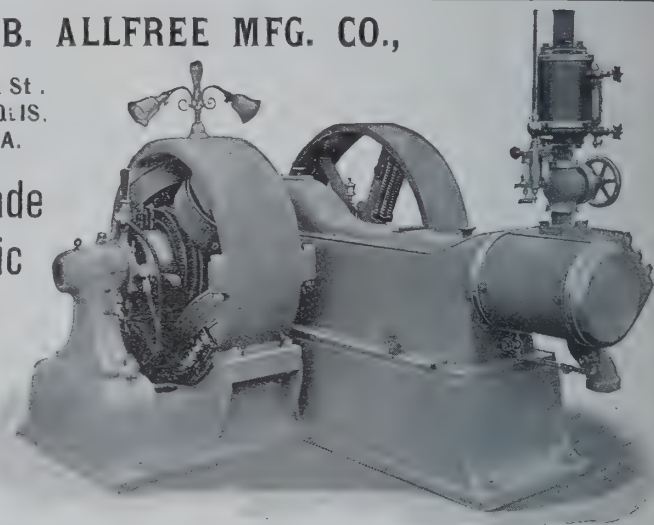
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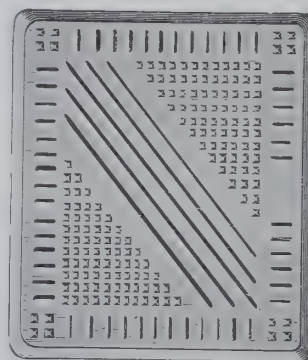
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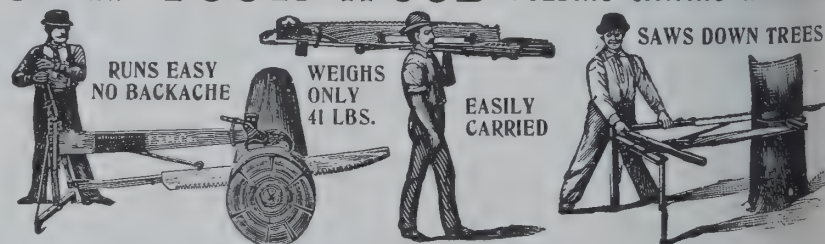
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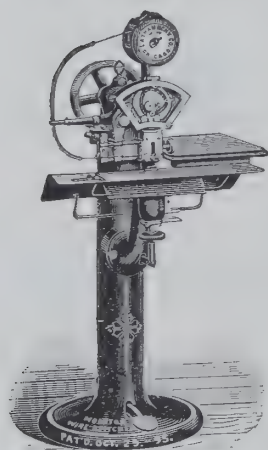
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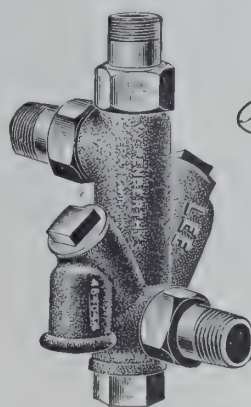
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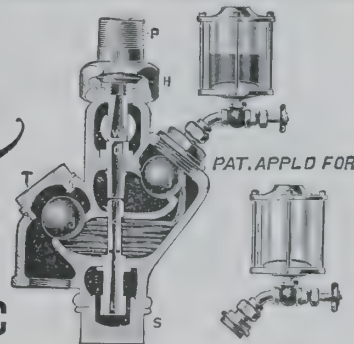
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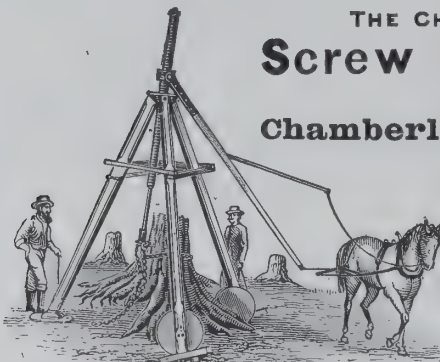
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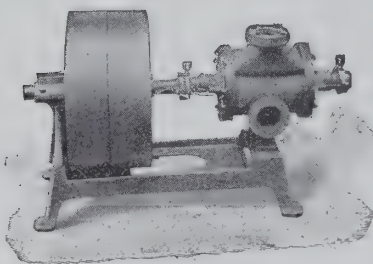
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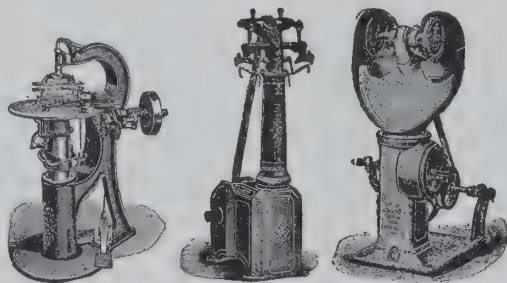
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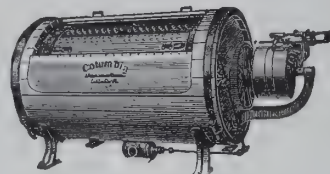


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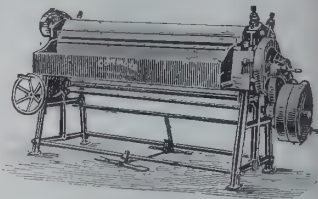
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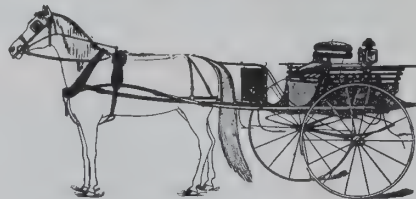
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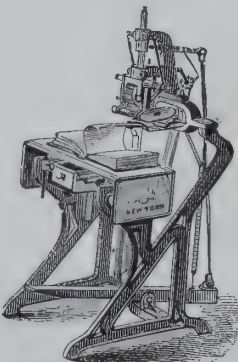
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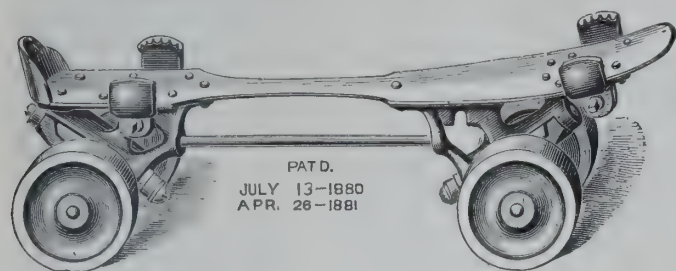
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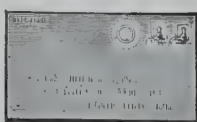
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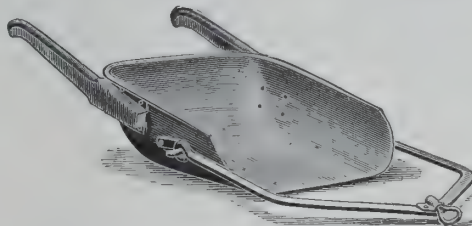
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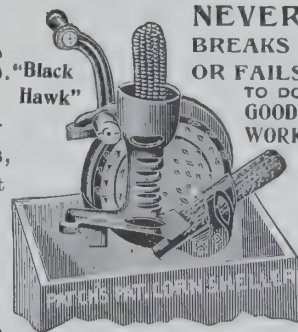
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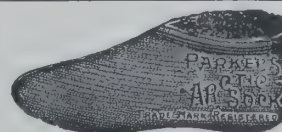
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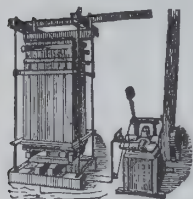
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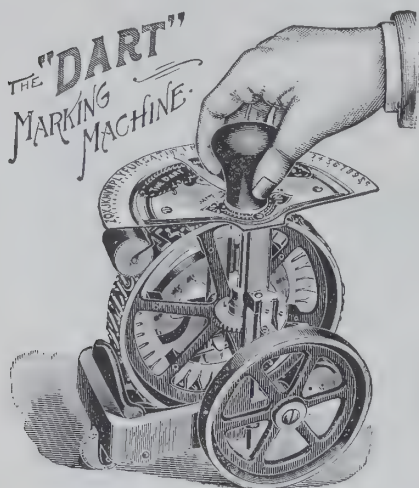
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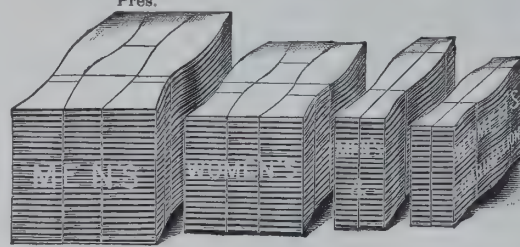
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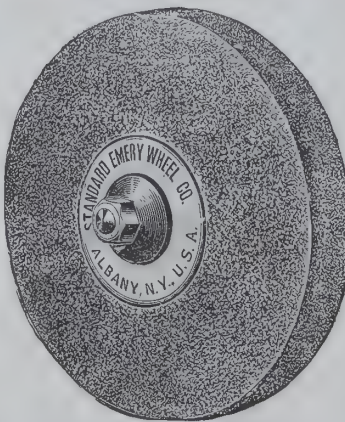
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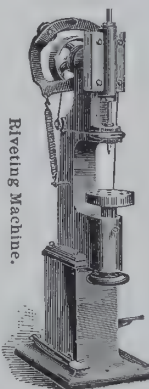
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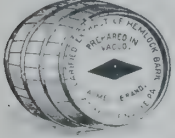
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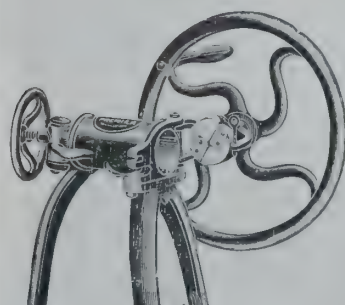
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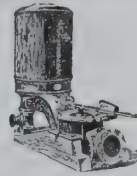
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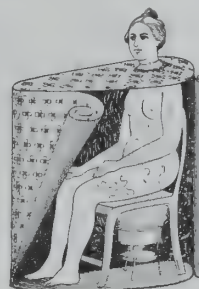
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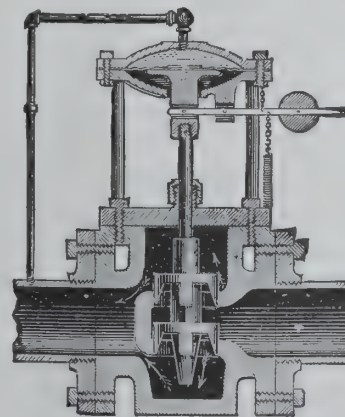
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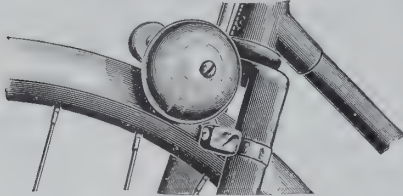
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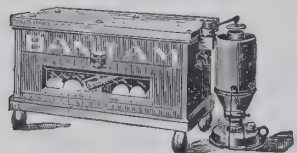
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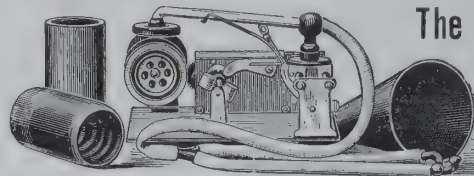
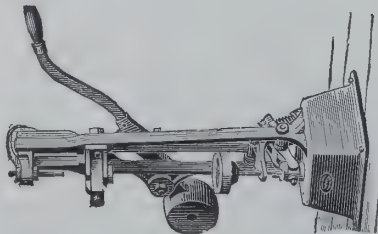
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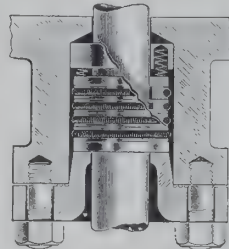
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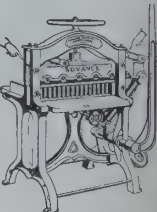
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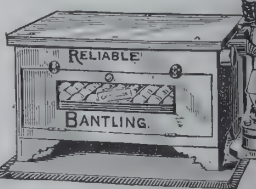
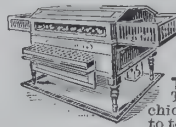
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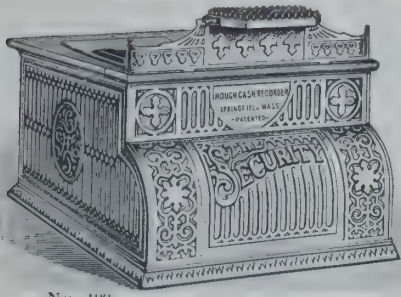
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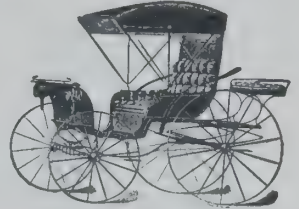
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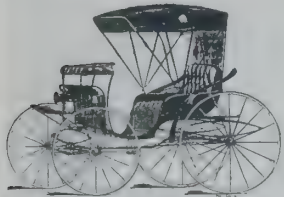
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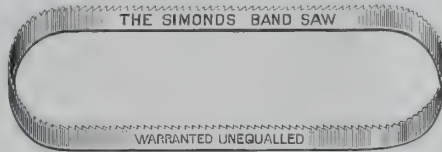


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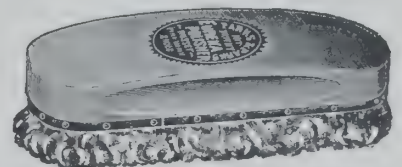
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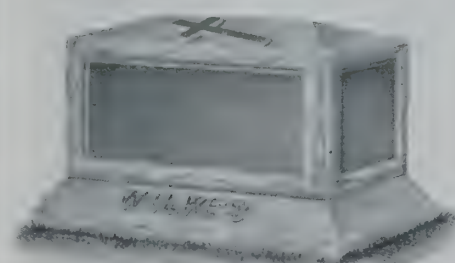
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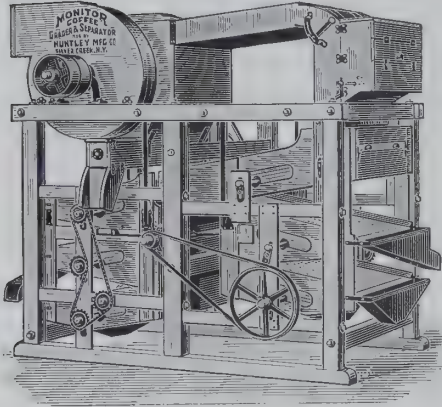
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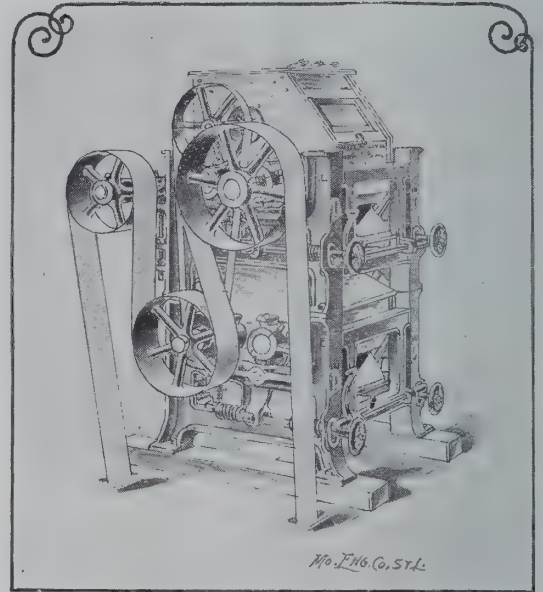
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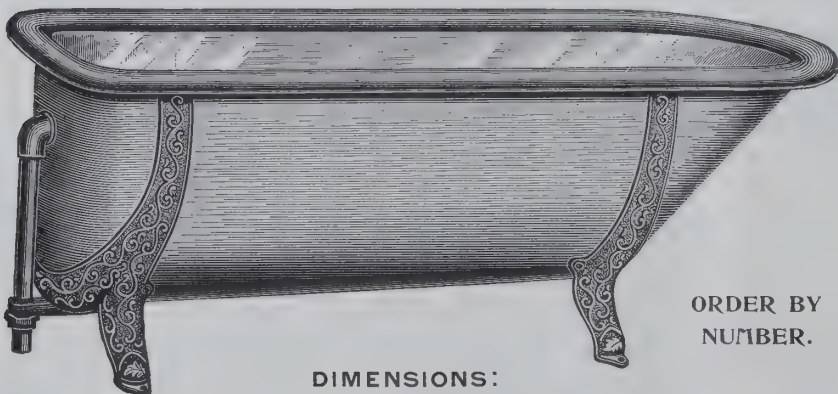
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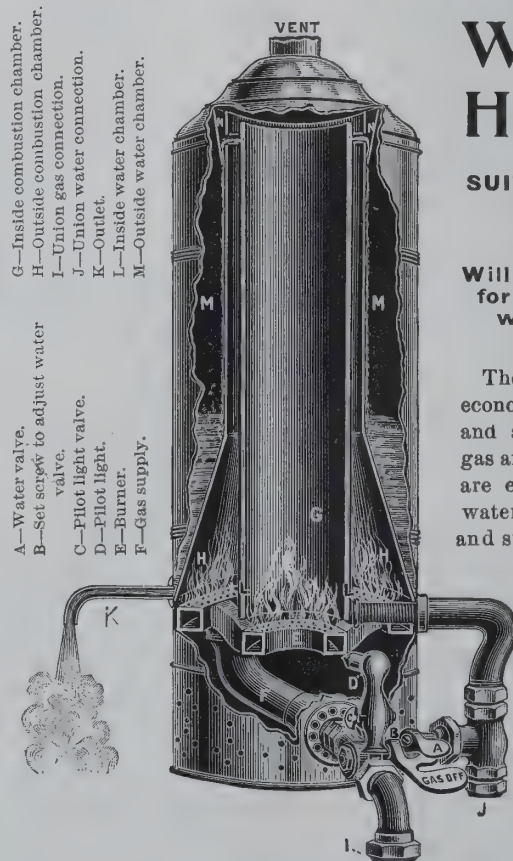
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# THE AMERICAN EXPORTER

(Founded by ROOT & TINKER, 1877),

AND

THE AMERICAN MAIL AND EXPORT JOURNAL

(Founded by HOWARD LOCKWOOD & Co., 1877).

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THE AMERICAN EXPORTER does not publish reading notices recommending goods of any special make. To do this for one manufacturer and not for another producing wares equally meritorious would be manifestly unfair. We therefore recommend our readers to carefully examine its advertising pages, which are filled with the announcements of many of the best manufacturing concerns in their respective lines. What our advertisers say therein affords highly interesting, instructive and profitable reading, especially for merchants and importers who desire to obtain all that is latest and best in the line of manufactured goods.

\* \*

Inquiries concerning goods advertised in this paper should be addressed direct to the advertisers themselves, or, if readers prefer to order through their American buying agents, the name of the manufacturer of the desired article should be carefully specified. As a rule, orders should not be sent direct but to experienced and reliable export commission merchants for execution.

We shall be pleased to send to foreign buyers not having buying agents in New York the names and addresses of reputable concerns best qualified to serve them, provided that they state the nature of their business and the class of goods they are most likely to require

## A WORD OF GREETING.

AS this issue of THE AMERICAN EXPORTER goes to its readers in an entirely new dress of type it seems a fitting occasion to say a word a little more personal perhaps than ordinary to those to whom the paper is addressed. To our readers in every land we wish to renew our assurance that the whole paper, from cover to cover, is devoted to their interests. If there are any lines of information that we can supply regarding American goods and methods that the paper does not contain we shall be only too glad to make good the deficiency to the best of our ability if readers will write directly to us. We believe that every succeeding issue will surpass those that have gone before in interest and value to buyers of American goods, since never before were American manufacturers so awake to foreign requirements or so successful in meeting them. To our advertisers we wish also to express our appreciation of the manner in which they have stood by us during the period of uncertainty at the beginning of the war. It is with profound satisfaction that we herald in this number the beginning of the end, and we believe that those who have stood by us so uninterruptedly will find a swift and rapidly increasing reward in the revival of international confidence and trade that is already beginning.

## SANTIAGO.

ON Sunday morning, July 3, the Spanish fleet under Admiral Cervera, that had for many weeks been "bottled up" in the harbor of Santiago de Cuba, attempted to escape. Owing to the presence of the sunken *Merrimac* in the channel, the vessels were obliged to pass out in single file. Two of them, the torpedo boat destroyers *Furor* and *Pluton*, were riddled by a storm of shot and shell and sunk almost immediately before getting two miles from the mouth of the harbor. The cruisers, all of them armored and carrying heavy batteries, kept on to the westward, closely pursued by the *Texas*,

*Iowa*, *Oregon*, *Indiana* and *Brooklyn*; the *Gloucester* remaining behind to dispose of the torpedo boats. About eight miles from the harbor the *Almirante Oquendo* was run ashore in a sinking condition and on fire in several places. The *Infanta Maria Teresa* followed scarcely a quarter of a mile farther on, while the *Vizcaya* kept on for two miles farther, when she, too, ran ashore, an explosion following almost immediately after. The *Cristobal Colon* succeeded in keeping her pursuers off for a much longer run, but she was at last headed off by the *Brooklyn* and overhauled by the *Oregon* and the *Texas* and struck her colors, running ashore about sixty miles from Santiago. The American loss was one killed and one wounded, while none of the vessels were damaged materially. The Spanish lost about 600 killed and wounded, among the former being Admiral Villamil, the vice-commander, and the captain of the *Oquendo*—who committed suicide. Admiral Cervera, the other captains and 1,300 men were taken prisoners.

With this battle all aggressive warfare on the part of Spain becomes impossible. Santiago is already invested on every side and will probably fall before this reaches our readers. Other land operations in Cuba and Porto Rico can be carried on at leisure without fear of Spanish molestation, and the war is no longer of serious concern to commerce.

We trust that Spain will shortly recognize the hopelessness of the struggle and that an armistice may soon be proclaimed while the terms of an honorable and a lasting peace are arranged.

## READING THE SIGNS.

EVERY one has experienced the effect produced by the signs of a busy street upon the passerby. At first their very multitude and variety prevents the mind from separating any one from its fellows and grasping its full significance. As the saying is, we "cannot see the woods for the trees." But as we pass and repass this feeling of confusion disappears and before long, unless we are very unobserving indeed, we are pretty sure to have noted every firm whose business is of any importance to us. When the occasion comes we know just where to go, and thus sooner or later the sign produces exactly the effect designed by its owner. So well recognized is this fact that merchants do not hesitate to pay enormous sums for locations upon those streets where great numbers of people pass when equally light and commodious quarters might be obtained upon a back street for a tenth as much.

Now, what we have just said of street signs is also true of advertisements in such a paper as THE AMERICAN EXPORTER. Our advertising pages present a vista of signs every whit as interesting and, when occasion arises, as valuable to the buyer as the signs on a busy street. There are not many lines of manufactured goods that a buyer will not find occupying good front positions on the ground floor on American Exporter street. If agreeable to him we shall be glad to have the reader join us in a little stroll along this avenue of signs, noting especially the wide variety of the products they represent.

At the very outset we face the name of Engelburg Huller Company, manufacturers of rice and coffee hulling machinery. This line of specialties suggests a wide range of agricultural machinery, among the manufacturers of which we should note as we pass along the Huntley Manufacturing Company, coffee and rice separators; the Nordyke & Marmon Company, flour and corn milling machinery; the De Laval Separator Company, cream separators; the Case Manufacturing Company, grain mills of all kinds; the Moline Plow Company, the Eagle Cotton Gin Company, the Aultman & Taylor Com-



pany, the Cardwell Machine Company, P. K. Dederick & Co., the Goodell Company, and a score of others with specialties of the utmost interest and value to farmers and to those who prepare the products of the farm and plantation for the markets of the world.

Next door to the Engelburg Huller Company, so to speak, are the Abendroth & Root Manufacturing Company, makers of water tube boilers. The Hazelton Boiler Company is another eminent firm engaged in making an extensive line of the same specialties. Across the street from the latter is the sign of Jas. Leffel & Co., makers of water wheels, a specialty also manufactured by the Pelton Water Wheel Company, while water meters are represented by such houses as the Thompson Meter Company and the National Meter Company.

But if we were to pause in front of every sign on this long and busy street it would take us all day, so we must content ourselves with a parting glance at the wide variety of goods represented. Here are manufacturers of steam engines and gas engines, of marine engines, portable engines, hoisting engines, hydraulic engines and gasoline engines. In electrical apparatus and supplies are firms manufacturing every known appliance from central lighting and power stations complete to phonographs, storage batteries and motor brushes. In bicycles and supplies two score firms are represented, offering every type of high-grade machines, as well as saddles, lamps, bells, handle bars, pumps, posts, lubricants and every conceivable bicycle accessory.

In machinery there is the same wide variety. The most eminent houses in America announce their long lines of wood-working machinery, boot and shoe machinery, metal-working machinery, soapmakers' and butchers' machinery, not to mention machinery for sugar mills, flour mills, etc., and electrical machinery already mentioned, and a hundred makers of machine tools and mechanics' specialties, such as wrenches, clippers, valves and injectors, belts and belting, files, drills, steam gauges, etc. Besides these we note in passing the signs of manufacturers of elevating and conveying machinery, brewers' and bottlers' machinery, of paper-bag machinery, oil and water well drilling machinery and pumping machinery of every description, as well as hand-pumps and fire-engine appliances.

Manufacturers of steel from mammoth bridges and armor plate for battleships to rivets are represented; makers of carriages and carriagemakers' forged irons and supplies, of wheelbarrows, road scrapers, railway cars, of rifles and photographic cameras, of laundry machinery, ice-making machinery and refrigerators are all represented. There are signs calling the reader's attention to makers of boots and shoes, shoe lasts, cloth and clothing, to makers of desks, wardrobes, brass and iron bedsteads and all kinds of furniture, of bathtubs and lavatories, and all kinds of plumbers' and housebuilders' supplies. The reader has but to glance through this long array of signs to learn an occasion where he can purchase shade rollers, coffee mills, boot and shoe polish, printing presses, paints, varnishes, organs and pianos, playing cards, a dozen kinds of food products that American specialization has transformed from common cereals into the daintiest of preparations; jewelry and silverware, cordage, and a miscellaneous line of almost endless extent. For the office he will find represented every specialty that has made American business methods so rapid and characteristic, from roll-top desks and typewriters and supplies to paper, copying books and pens. For the store, rubber stamps, cash registers, rolling step ladders and a score of similar helps to business.

The list might be continued almost endlessly, but we fear that our readers will tire of so long a stroll. Practically, it is

enough to remember that they are all there—these silent, ever-ready signs—waiting for the moment when you need the information they have to impart, namely, where the most modern, the most ingenious, the cheapest and the best types of whatever you desire may be found. When the time comes that an article is required, be it a monkey wrench, a hundred bicycles or a steel bridge, do not fail to look through the advertising pages of THE AMERICAN EXPORTER before deciding where your orders shall be placed.

### AN ENEMY TO AMERICAN EXPORT TRADE ON THE RUN.

WITHIN the past two or three months the freight rates between New York and Australia have been reduced nearly one-half owing to the breaking up of the "American Shipping Combination" or "Shipping Ring." This organization operated a number of lines of sailing vessels plying between America and Australasia, and had up to the present time succeeded in holding this commerce down to that old-fashioned method of transportation in spite of the fact that eight mail lines of steamships now touch at Sydney alone. Newcomers and rivals were either crushed or absorbed into the combination. The break came with the recent establishment of a direct line of steamships to ply between New York and Melbourne, Sydney, Brisbane and Adelaide. It is asserted, and seems probable, that those controlling this new line will refuse to enter the combination, and that the reduced rates now in force will be permanently maintained.

The reduction in freight rates, which were undoubtedly exorbitant, and the substitution of modern steamships for archaic sailing vessels will be only a part of the gain, however. The shipping "ring" was in collusion with a number of the largest Australian importers, so that between them they might share enormous wholesaler's profits. So unscrupulous had some of them become that not only were the prices of American goods to the Australian retailer vastly enhanced, but their quality was deteriorated, inferior goods being represented as the best, thus injuring the reputation of American manufactures in those markets in two ways at once. As an illustration we may quote from a recent letter from a well-informed manufacturers' agent in Australia. He writes:

Since starting in to represent manufacturers direct, I have found it impossible to get fair play from the importers. They decline to do business direct with the manufacturers or recognize resident representatives. The result is that I have had to get stocks of goods here myself, and demonstrate to the importers that they had to recognize me and my factories, whether they wished to or not. When I started with fly papers the wholesale profit was 166 per cent. I fixed prices so that the consumers now get the article at less than one-third what they paid before I started. Some of the jobbers cut up rough at a 25 per cent. profit, and I learn this mail from the factory that one of the shipping ring offered them a 1,000-case order to give me the run, for that is what it amounted to. I started to sell bolts and forgings, and not being able to get any satisfaction from the importers, I saw a few of the coach builders, and I found that on bolts which the manufacturers got a bare margin on the jobbers were getting 400 per cent. I sold about \$800 worth of bolts to a few shops at reasonable prices, which were duly delivered, and now I intend to issue a full price list in opposition to the importers' prices and the inferior goods and poor assortment which they have in stock. I have been round to all the colonies on wood hames, with most satisfactory results, but I found everywhere the jobber wants 100 to 150 per cent. on American hames, whilst they get only ordinary profits on English hames, just the same as they get small profits on English bolts. I have a stock of hames here, and instead of depending on the importer for trade, I am issuing a price list to all the retail trade to burst the jobbers' distributing monopoly. English sash cord is sold at small profit, yet the American cord I sell is held for 100 per cent profit. English tacks are also a cut line, yet about 200 to 300 per cent. is put on the American.

In addition to this sharing of exorbitant profits with the few favored importers who were in the "deal," the export ring in New York practically asserted that no goods could be



shipped to Australia without paying tribute to its members in some form or other. A correspondent of *American Trade*, the official organ of the National Association of Manufacturers of the United States, describes their methods as follows:

Each exporter publishes some kind of a device for soliciting manufacturers' advertisements. I counted up the advertising space of the price current of one of these houses in the Australian ring, and I estimate the charges on manufacturers from that house alone at about \$75,000 per annum for what it requires considerable imagination to call advertising. Taking advantage of the ignorance of manufacturers, these houses represent themselves as selling agents and receive selling commissions to a large extent, which is hardly consistent with receiving a buying commission to beat down the manufacturers. Then they talk of the risk of foreign credits, and manufacturers grant them 5 per cent. for assuming such risks. On goods like kerosene they buy and sell on their own profit, as they advertise their own brands. On such goods as axe handles no manufacturer can get orders who does not pay tribute in some way. Of course, very large manufacturers are independent, but the great bulk of them simply fall over each other trying to buy orders from these few export houses.

Of course, these commission buyers take no risks about credits. The business is cornered, so they do not have to. No goods can be got except through them and by their ships, and they can look after what is due them. Besides their control and profits direct from manufacturers, they have the carting, insuring and ocean freight profits.

Altogether, the shipping combination that has heretofore controlled trade between America and Australasia appears to be an organization that both the American manufacturer and the Australian consumer can get along very well without. While the establishment of rival lines is the beginning rather than the end of the struggle, the fact that rates have already fallen so far indicates that this great enemy of American and Australian trade—albeit so loud in its protestations of disinterested friendship—is fairly on the run. As the *Australian Ironmonger*, in an editorial quoted in full on another page, remarks, in this very connection: "It is a matter of common experience that heavy losses are constantly made through being just a little bit too greedy." While we have no wish to injure any particular firm or to promote the success of another it certainly is not too much to hope that hereafter our trade with the great and progressive communities in Australia, and their trade with us, may be permitted to expand without being subjected to the vexatious and not infrequently ruinous hindrances above described.

### THE ANTI-COLONIAL POLICY OF FRANCE.

IT has always been the policy of this paper to refrain as far as possible from criticising the acts or policies of our own or other governments. The following letter, however, presents a matter of such importance and involves principles of such far-reaching application that we feel that we cannot in justice either to our readers or ourselves refrain from touching upon it. A translation of the letter follows:

TUNIS, June 4, 1898.

*The John C. Cochran Company, Bennett Building, New York:*

GENTLEMEN.—We have received your favor of May 18th and take pleasure in replying thereto. Your servant, Alfred Chapelle, in his capacity as representative of the United States at Tunis, has for many years sought to establish commercial relations between the United States and Tunis. His efforts have succeeded partially, and we have at last seen arriving at Tunis your kerosene, cotton oil, alcohol, tobacco and your machinery of every description. We have not, however, succeeded in obtaining a line of steamships direct from New York or some other American port to Tunis, and the increased cost which the transportation of merchandise by intermediary countries throws upon American products prevents competition with the goods of France and Italy. We have hoped that we should finally obtain this line, which would have facilitated everything, when to-day we find ourselves face to face with a new obstacle against which resistance is impossible. The French Government has just established a new general tariff, which, in spite of existing treaties between the United States and Tunis, treaties not yet denounced, is absolutely prohibitive and prevents us from receiving the products of your country.

Your servant, as Consul of the United States, has notified the Depart-

ment of State at Washington regarding this state of affairs at once abnormal and threatening to American commerce. There was a question here of both dignity and interest at the same time which was apparently not grasped for all that it was clearly brought out on several occasions. The American treaties here seemed to be regarded as absolutely worthless, to be set aside or annulled without scruple. As long as this indifference continues it will be useless to think of doing anything in the face of the new tariff. Kerosene is taxed as before; that is to say, at 8 per cent. ad valorem, but cotton-seed oil pays 35 francs per 100 kilos, a duty of 70 per cent., which is altogether prohibitory, when, according to the terms of the treaties, it ought to pay only 8 per cent. like kerosene and all the other articles such as sugar, alcohol, tobacco, etc., in which you would be interested.

This amazing indifference on the part of a power like the United States discourages absolutely all those houses which seek to do business with North America. It is, then, useless to do anything at present until this question shall be decided, and we await the decision with impatience. In the meantime you will do well to devote your attention to this matter, which is exceedingly serious and which affects not only the commercial interests of America but more especially the dignity of the Government and of the nation.

Accept, gentlemen, my salutations, etc.,

A. CHAPELLE.

It is too soon to discuss the attitude of the Department of State toward this matter. We have made such representations as our correspondent suggests in that quarter, but we must confess that there is little likelihood that anything can be accomplished. We wish, however, to state our views, not of the justice, but of the wisdom of the French attitude.

The foregoing is merely a fresh proof of what we fear must be regarded as the settled colonial policy of France. The history of Madagascar furnishes another illustration. Not that the authorities of Algiers have ever indicated any intention of imitating the bigotry and brutality that has characterized French rule in Madagascar. We are discussing at present only the commercial aspects of French colonial expansion.

Apparently the French Government is convinced that colonies exist, not for themselves but for the mother country; are not so much to be developed and made strong as to be exploited and bled for the benefit of somebody at home. This was the colonial theory of Rome. It has been the colonial theory of Spain. It is and has always been a theory doomed to failure and disappointment. Strong and loyal colonies can never be established except by home legislation framed steadily with a view to *their* development, *their* greatness, *their* wealth, not that of the mother country alone. Great Britain started out with this false idea, but received a sharp lesson in the War of American Independence, which cost her the brightest jewel in her crown. She learned the lesson, bitter though it was, and has steadily followed the right track ever since. As a result of the lofty English theory of colonial expansion the tight little island is the head of an empire, not only the greatest in area and population, but in wealth and intelligence of any in the world. More than this, her sovereignty is not that of a master among slaves but rather that of a mother among her daughters, a real sovereignty founded upon loyalty and love.

It is not against tariffs that we wish to protest. A protective tariff is justifiable on many grounds. But the colonial tariff should, if protective, protect the colony itself, foster its industries, encourage its manufactures, not merely wall off that colony so that it may be despoiled by one nation without fear of competition from the others. The latter policy merely exposes the colonists to robbery and commercial handicaps in every direction. If agriculturists, they are forced to buy their machinery in the dearest and least progressive markets, to submit to the most exorbitant freight charges, while they can sell their products—even to the mother country—at only the prevailing price the world over. It is blindness to this simple economic fact that has made the colonies of certain nations forever stunted and starved, while those of wiser states have grown to take their places among the great nations of the earth.



**ANGLO-SAXON UNION.**

NO result of the war between the United States and Spain that has yet manifested itself is more momentous than the universal manifestation of the common good-will and sympathy that pervades the entire English-speaking world. From every quarter of the globe THE AMERICAN EXPORTER has received letters testifying to the cordial spirit of friendship and good-will that animates our friends everywhere in this struggle. We might fill a column with extracts, but a few will show the feeling. Take this one from Johannesburg, South Africa :

"All the colony here is proud, very proud, of your success so far in the war. The United Union forever! There can be no question about her ultimate victory."

This reached us from Canada, one out of many similar :

"I very much hope that nothing will ever happen to separate these two flags—American and English. With these two flags combined, and all that the combination means, it seems to me that it is a notice to the world that Liberty, as enunciated by these peoples, shall not perish from the earth."

And this from Sydney, Australia :

"Am glad that you are winning. I hope also to see an Anglo-American-Australian-African-Indian-Canadian Alliance for all time. English-speaking races must all be united. We are all with your country in Australia."

Whether the future is to see this widespread sentiment in favor of unity crystallize into concrete form is at present, as Lord Dufferin recently said, "a matter for pleasant speculation." But certainly it is good to know that we are drawing together, not drifting apart, and as to the cordial and clear understanding that has come, there is no reason why it should not last forever. As Colonel Hay, the able American Ambassador to Great Britain, remarked in his Fourth of July speech in London, "It injures none, and threatens none. All its ends are peaceful and beneficent."

**INDIRECT RETURNS FROM EXPORT ADVERTISING.**

THE two extracts following, from letters received by the same mail, one from Ciudad de Bolivar, Venezuela, the other from Monte Cristy, Santo Domingo, may be of interest to some of our readers as indicating very clearly the indirect manner in which advertisers in export publications secure returns. The letter from Venezuela says :

"We have been receiving THE AMERICAN EXPORTER for some time past and are pleased to say that it undoubtedly helps the export trade. We, as well as others, examine such papers, and when we see anything that is likely to sell here we cut out the advertisement and send it to our buying agents in New York. Of course neither you nor other publishers ever get credit in such cases."

The letter from Santo Domingo states almost the same idea in somewhat different language :

"It certainly is impossible to estimate the limits wherein a paper like the EXPORTER is likely to subserv the ends for which it was created, as it reaches merchants and purchasers in all directions and does its work, undoubtedly, on more occasions than can be recognized and placed to its credit."

It is a peculiarity of export advertising that it does not generally produce *direct* returns, and also that it does not produce returns *directly*. The reason for the first is that export orders are almost invariably sent to the manufacturer through some export commission house or buyer's agent in this country. The second is due to the fact that it not only takes a long time for an issue of the paper to reach every one of its readers throughout the world and for letters from them to come back, but also because many buyers do not respond at all until they have occasion to make purchases, when they look up the paper in which the article they desire was advertised and send in their order. In this way it not infrequently happens that returns continue to come in long after the advertisement has expired. Manufacturers also fail sometimes to consider that it is not the first order only that the advertisement has

brought to them, but the buying connection, that often means many orders. We were recently informed of a case in which a single buyer—who wrote directly to the manufacturer in sending his first order, and mentioned this paper in doing so—purchased one machine at first, then others until he had bought fifty in all, making a total of some \$25,000 in value from this one customer inside of two years.

**EXPORTS FOR THE FISCAL YEAR OF 1897-1898.**

IT is too soon for us to be able to state with exactness the figures regarding the exports from this country during the fiscal year ending June 30, 1898. We are able, however, to ascertain in a general way the facts regarding what is beyond all comparison the most remarkable export year in the history of the country. The exports represent a value of \$1,231,311,868, far surpassing the record figures of last year, which were \$1,050,993,556. In only two preceding fiscal years in our history have our exports passed the billion-dollar line, last year being one of them. Imports have fallen off during the year just closed, due in part to the fact that imports a year ago were abnormally increased owing to the change in the tariff, many buyers stocking up for a year or two in advance. Undoubtedly, however, the greater part of the decline is due to the fact that American manufacturers now supply many articles formerly imported exclusively. It is interesting to note in addition, that the balance of the gold movement has also been heavily in our favor, \$115,000,000 having been imported against only \$15,000,000 exported.

The total foreign trade of the country, exclusive of the specie trade, aggregated \$1,847,364,712, and secures for the United States the second place in the commercial world. Formerly we stood fourth, England, Germany and France being before us. Now we follow England closely.

The exports of breadstuffs, as compared with the same exports during the fiscal year ending June 30, 1897, have increased most wonderfully. Wheat has been exported to the extent of 146,623,250 bushels, against 79,375,372 bushels during the last year. Even the corn exports increased considerably, and the exports of the later months of the fiscal year seem to prove that the demand for our maize will be steady and permanent.

More interesting, however, to the readers of this paper is the fact that in spite of the enormous increase in the exports of agricultural products, which amounted during the eight months ending February 28, 1898, to nearly \$74,000,000, as compared with the same period of the previous fiscal year, the percentage of exports of manufactures as compared with the total exports has declined only 1½ per cent., while during the same eight months the total value of manufactures exported shows an increase of \$6,474,245. More striking still is the fact that during the fiscal year just closed, for the first time in our history, we are exporting more manufactured articles than we are importing. In the eleven months of the fiscal year for which the complete figures are now at hand, the exports of manufactured articles exceed the imports of manufactures by fully \$50,000,000, and for the full fiscal year the excess of exports of manufactures will probably be nearly \$60,000,000.

Altogether the situation is a most gratifying one, both to American manufacturers and foreign buyers, who have learned to regard the mark "Made in America" as an indication of sterling value. It is worth remarking in passing that so far from producing a fatal effect, as some alarmists predicted, the war has had simply no influence whatever. The exports for March, April, May and June have shown the same steady increase over the corresponding month of last year—record



months all of them, too—and the same quiet contempt for bugaboos and scares will undoubtedly continue to the end, which now, happily, seems to be in sight.

### THE EXPANSION OF AMERICAN TRADE.

ONE of the most significant utterances made by a member of the Government regarding the commercial future of the United States was the argument of the Secretary of State, Mr. Day, in behalf of a small Congressional appropriation for a commercial commission to China.

"The export trade of the United States," he said, "is undergoing a transformation which promises to profoundly influence the whole economic future of the country. As is well known, the United States has reached the foremost rank among the industrial nations. For a number of years its position as the greatest producer of manufactures as well as of raw products has been undisputed, but absorbed with its own internal development, and satisfied for the time being with the enormous home market of 70,000,000 people, it has until recently devoted but little concerted effort to the sale of its manufactures outside of its own borders. Recently, however, the fact has become more and more apparent that the output of the United States manufacturers, developed by the remarkable inventive genius and industrial skill of our people with a rapidity which has excited attention throughout the great centres of manufacturing activity in Europe, has reached the point of large excess above the demands of home consumption.

"The conditions of export trade, it may be assumed, are now being studied by every manufacturer who is confronted by the problem of finding new outlets for his products. The reports of the diplomatic and consular officers of the United States show that as the result of individual effort, with but little concert of action among exporters, many lines of American manufacture have already been introduced into European countries of long-established industrial pre-eminence, and are finding ready sale in competition with their own home products."

This is official testimony from the highest possible source in support of the position all along maintained by this paper, that the recent phenomenal growth of American export trade has been due to perfectly natural causes, and that it will continue without interruption. It has taken many years for our manufacturers to catch up with the enormous demand at home for every conceivable variety of manufactures. It has taken time for our engineers to span the continent with the existing network of railways, highways and canals. Cities originally built in wood have been rebuilt with brick and yet a third time in stone and steel within the memory of men yet in middle life. Vast systems of water supply, of sewage, of paving, lighting and street transportation have been carried out, and in many instances, so rapid has been the municipal growth, have been done twice within a quarter century.

To keep up with this almost incredible rapidity in the increase and the diversification of the domestic demand was in itself a mighty task. The energy and the resources that have enabled our manufacturers to accomplish it is a sure guarantee of their ability to carry their operations successfully into the larger markets of the world.

ONE of the most striking points about the now famous naval fight at Santiago is the manner in which it confirms the lesson of the naval battle at Manila, regarding the importance of having first-class machinery, and men capable of handling it with coolness and precision at a critical moment. In each battle the American fleet surpassed its

antagonist only slightly on paper. In actual conflict, however, the disparity proved perfectly overwhelming in both instances. This was due beyond question to the greatly superior condition of the American ships, and to their superior handling. A modern war vessel is a nest of machinery, besides being both literally and figuratively a machine itself. A modern naval gun is a mighty machine requiring the most skillful and dexterous management. With all honor to the brave officers and men who won the two great naval fights of the war, and with all praise for their intelligence and skill, we feel that a share of honor and praise is also due to those who constructed the guns and ships and engines that in the storm of battle proved to be so stanch and true.

Later and more detailed accounts of the battle off Santiago indicate that the American victory was won with fewer ships in action than was at first reported. The battle ship *Indiana* took no part in the engagement, as stated in a previous editorial that went to press before this was written. This reduces the disparity between the two fleets a great deal, particularly when it is remembered that the *Gloucester*, which fought gloriously throughout the action, was a converted yacht.

A VERY interesting straw, showing the steadiness of the increase in our exports of manufactures, is the following table giving the exports of manufactured goods by months for the three calendar years ending December, 1898, the third, of course, being incomplete:

	1896	1897	1898
January.....	\$18,732,759	\$20,621,179	\$22,982,919
February.....	17,259,459	20,248,989	21,048,631
March.....	19,125,795	25,876,861	28,214,450
April.....	21,386,757	24,014,351	25,992,552
May.....	22,016,229	26,458,000	27,031,700
June.....	21,898,885	25,873,997	.....
July.....	21,562,599	23,602,784	.....
August.....	21,134,176	22,900,927	.....
September.....	21,699,345	22,749,114	.....
October.....	23,469,182	22,247,998	.....
November.....	21,639,073	21,688,204	.....
December.....	23,766,283	23,370,317	.....
Total.....	\$253,681,541	\$279,616,898	.....

SOME of the newspapers which reported the death of Mr. W. M. Cutler, who for six years represented THE AMERICAN EXPORTER in Western New York, stated that he had terminated his connection with this paper before his death. This was not the case. Only a few days before we had a pleasant and hopeful letter from him, and all connected with the paper were deeply pained to learn of his sudden and untimely end. He enjoyed the highest confidence and esteem of all who knew him, and had every reason to look forward to a long and prosperous life.

WE note in a copy of a diplomatic and consular report, published by the British Foreign Office, on the cotton manufacturing industry of Mexico, an interesting tribute to a gentleman well known to many of our readers. The author of the report, Mr. Lionel Carden, formally expresses his obligation "for the valuable assistance received from Mr. Juan Bannister, importer of machinery for cotton factories, who, from his long experience in the business, probably knows more about the machinery used in the different mills than any one else in Mexico." Mr. Bannister has long been known in New York as a leading importer of textile machinery in Mexico, and it is pleasant to note that so unusual a compliment as mention in a consular report has been paid to him.



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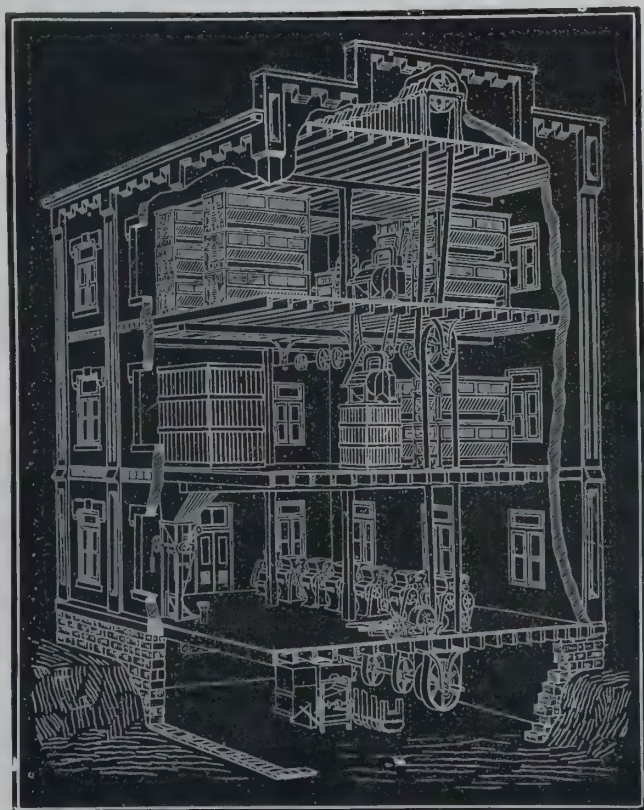
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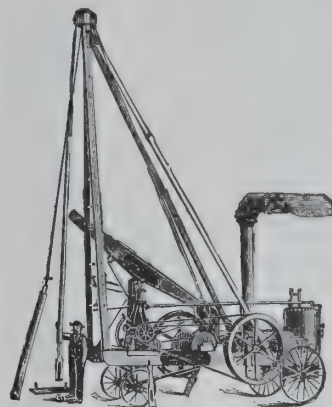
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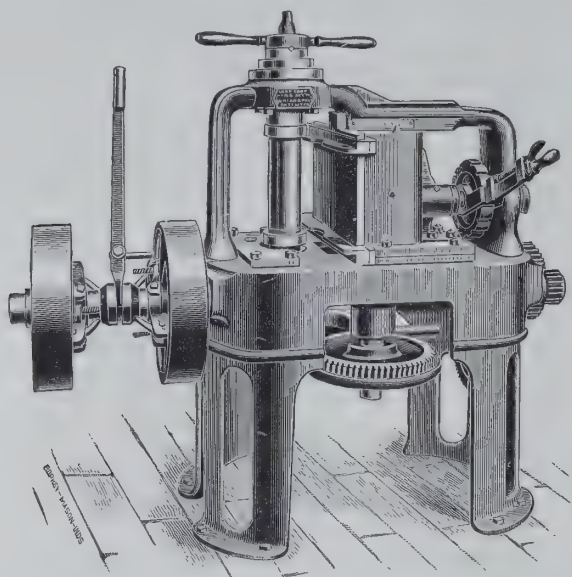
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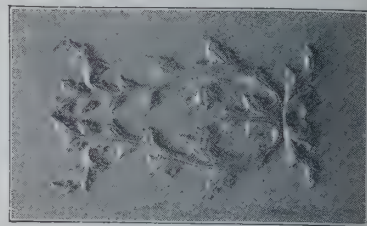
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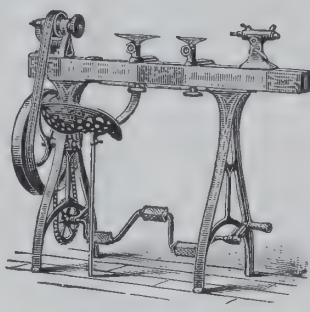
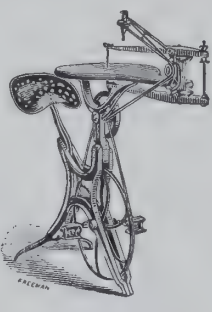
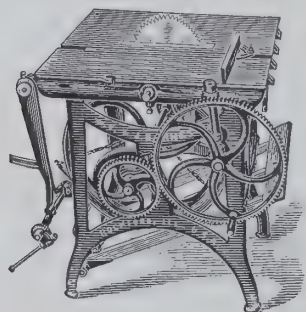
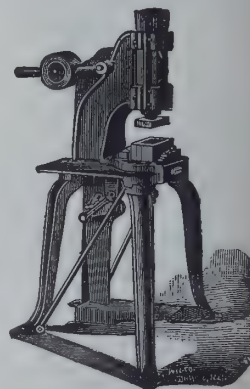


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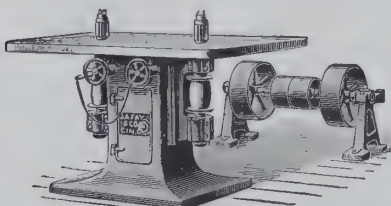
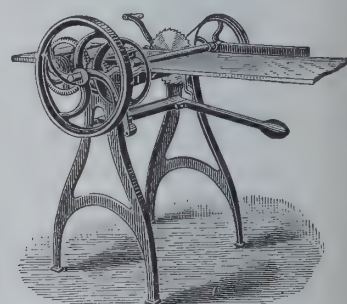
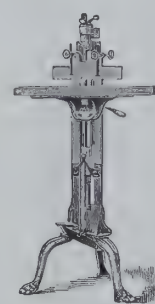
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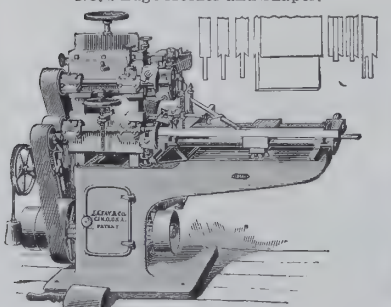
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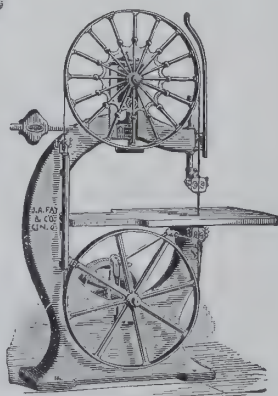
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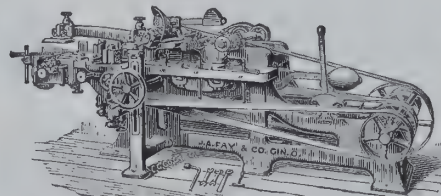
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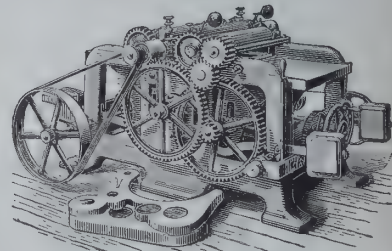
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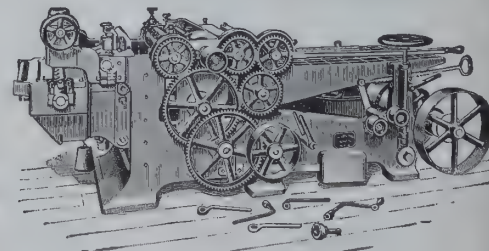
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### Freights from America to Australia.

IT is a matter of common experience that heavy losses are constantly made through just being a little bit too greedy. Apparently the American Shipping Combination may furnish an illustration. During the month it has been announced that the well-known shipping firm of Flint, Eddy & Co. had fixed a ship for Melbourne and another for Sydney, supported by two or three Australian merchants, and at lower freights than had been charged for some years. The American shippers at the present time comprise some half-dozen well-known indent and commission houses, who have practically controlled the freights. When any opposition raised its head during the past few years it has commonly been asked to come in and share the profits, but on the present occasion we are assured that the opposing firm, which has widely extended business in many parts of the world, will not yield to any solicitations of this kind. The *Sydney Daily Telegraph* has devoted a great deal of space to the matter, and in its first article stated that in the matter of kerosene alone the ring must have divided among themselves a profit of something like £40,000 in the year 1897, and that the profit on the chartering must have been at least £100,000. In a later issue the *Telegraph* goes into details and shows that 120 vessels were dispatched from New York to various ports in Australia with a registered tonnage of 142,133. The estimated cost of charters was just under £150,000, and freights paid by the Australasian importer, calculated at 30s. and 35s. a ton, just under £240,000, giving close on £90,000 profit for the ring for the year on the registered tonnage. But as the actual tonnage is about double the registered tonnage, it is safe to add at least 50 per cent. to the amount, raising it to a few pounds under £140,000. The strong point against the current system has been the fact that the commission houses not merely sold goods to the importers, but having to fill up the ships on their own account, competed with the importers in these markets, of course with the ability to undersell them.

One effect of the agitation was an offer from the shipping houses of a rebate or discount of 10 per cent. on current freights should importers continue to place their business with the ring as heretofore, and agreements have been circulated binding importers to confine their freightage to the firms in this association. It is pointed out that this would not prevent the signatories dealing with other firms on a cost, insurance and freight basis, and strengthens the hands of the opposition, showing that the ring were at any rate prepared to sacrifice 10 per cent. profit.

Another result was that exceedingly large orders were placed for kerosene at greatly reduced prices, so that something like a year's supply for each of the principal centres is on the water at the present time, and it was actually suggested that trade in kerosene should be pooled and placed under the charge of a joint agency.

The last step was announced on March 29th, when cablegrams were published stating that Flint, Eddy & Co. had placed a steamer to start in June for Australia, calling monthly at Melbourne and Sydney, and alternate months at Brisbane and Adelaide. It was also announced that the combination had placed another steamer to start the same month. To fulfill the time conditions in the rail contract referred to elsewhere, steam was essential for the first delivery. The so-called ring have been so successful in the past in absorbing all competition that it is exceedingly rash to prophesy success to the present opposition. A steam service having once been established between New York and Australia, it seems unlikely that it will ever be abandoned, though the bulk of the goods now imported are hardly able to bear much increased freights. If it is found possible to conduct the steam service on anything approaching the same basis of freights, light will be thrown on the past profits on the sailing ship service.—*The Australasian Ironmonger*.

**American Industrial Progress.**—"The United States is rapidly becoming the greatest industrial country in the world and our most formidable rival in the markets which have hitherto afforded an outlet for our manufactured products."—*Engineering* (London).

### Opportunity of the Machinery Builder.

THERE has been no time in the industrial history of the United States, says the *Age of Steel*, when its machinery builders have had so broad an opportunity and so many coincident factors of encouragement as at the present time. The country has reached a point in its historic development where its puissance in war and its potentiality in the arts of peace are among the surprises of older nations. Aside from all political interests or prestige, it has in mechanical skill outdistanced its older competitors and become the acknowledged leader in all industrial and labor-saving devices. The use we make of this supremacy depends on the enterprise and business tact of our manufacturers. The home market is constantly broadening. All kinds of enterprises are multiplying, and the manifest trend of industrialism to economies in production by labor-saving appliances is rapidly centralizing national prosperity on the high efficiency of its machinery. In all kinds of trades the same tendency is apparent; from the man who makes shoes to the manufacturer of locomotives, and the maker of a lawn mower to the builder of a steamship. We have passed the transitional stage in this matter.

Machinery is everywhere—in the field, the home and the workshop. Nor is its evolution arrested by its common use. The best machine of a certain type is but the forerunner of a better, and one has but to read the long list of second-hand machinery for sale to see at a glance the improvements that are rapidly taking place. There is no standing still in this business. The hunger for machinery is on us, and as the markets of the world open their doors to our products the appetite will continue to be whetted and unappeasable. In the world beyond our sea lines the same transitional conditions exist. Industrial development is cracking the old crust that for centuries has smothered industry and commerce. Light is coming in through the cellar grating, and the stairway to better conditions is being sought for and found.

In Russia, China, Japan, in Asia and in Africa, industrial enterprise is displacing traditional apathy. No country escapes the touch of this vivifying process. What it may bring about in a political sense and in the transfer of national prestige is one of the problems of the statesman, but what it will do for the machinery builder is beyond question. Our exports of machinery are rapidly increasing, and without respect to race or flag. For every form of industry we have special appliances. In agriculture, mining, engineering and manufacture the American machinery builder has made his special mark. In implements of war, as in those of peace, the same brainy ascendancy is observable. This is not underrating the ingenuity or enterprise of some of our competitors, who have made and are still making their broad mark on the industrial history of the world. For various reasons, economical as well as intellectual, the United States has reached its present status, and to maintain it the same alertness and vigilance will have to continue fresh and unwearied.

### The Colonizing Nations and Their Possessions.

THE colonial possessions of some of the leading nations of Europe are not without interest just now. Some of these have been gained by conquest, others have come along, as have our territories into the sisterhood of States, by the forces that make a higher civilization a missionary to that of a lower type.

Country.	Motherland. Sq. miles.	Colonies. Sq. miles.
Great Britain .....	120,979	16,622,073
France .....	204,092	2,505,000
German Empire.....	208,830	1,615,577
Portugal .....	36,033	809,914
Holland .....	12,648	783,000
Spain.....	197,670	405,458
Italy .....	110,646	240,420
Denmark (Faroe Islands, Iceland and Greenland) .....	15,289	86,614

Country.	Motherland. Population.	Colonies. Population.
Great Britain .....	39,825,000	322,000,000
France .....	38,520,000	44,290,000
German Empire .....	53,325,000	7,450,000
Portugal .....	5,050,000	10,215,000
Holland .....	4,930,000	34,210,000
Spain .....	17,300,000	9,800,000
Italy .....	31,290,000	195,000
Denmark (Faroe Islands, Iceland and Greenland) .....	2,175,000	130,000



### Our Trade with Japan.

THE growth of American commerce with Japan, and especially of American exports to that country, is discussed at considerable length in a recent number of the British Diplomatic and Consular Reports just received by the Bureau of Statistics. The statement is in the form of a report from A. H. Lay, Assistant Japanese Secretary to Her Majesty's Legation at Tokio. The report discusses the foreign trade of Japan during the year 1897, and after showing that Great Britain's imports into Japan increased in 1897 by about 5 per cent. and that those from Germany amounted to only 8 per cent. of the total instead of 10 per cent., as in the previous year, says:

"The United States has acquired a very largely increased share of both the import and export trade, the value of her imports and exports having risen no less than 57 and 55 per cent. respectively."

The table of the total imports into and exports from Japan by countries shows that the imports from the United States increased £1,024,839 against £332,488 increase from Great Britain, £639,915 increase from British India, £10,430 increase from Germany, £637,751 increase from China, £222,505 increase from Hong Kong, and a decrease of £304,051 in the imports from France. It will thus be seen that the increase in imports from the United States into Japan was greater in 1897 than from any other country.

Discussing the details of the gains made by the United States in imports into Japan, the report says:

"The increase in the import of raw cotton amounted to 31,941 tons, to the total value of £980,279. From British India comes the largest supply, namely, 180,053,500 pounds. China was next with 65,482,930 pounds; then the United States with 46,365,097 pounds. French India sent 2,191,200 pounds. The United States shows much the largest increase, owing to the fall in the quotations for American cotton caused by the unusual largeness of the crop.

"Pig iron imported amounted to 3,570 tons more than in 1896, and prices have increased to a large extent owing to heavier freights. In pig iron the United States appear for the first time, being credited with a value of £6,130 as against £83,071 worth from Great Britain. American iron does not appear to have met with very much favor, 'Redcar' and other British brands being preferred. So far the shipments have been experimental, but it is understood that large quantities will arrive monthly in future, shipped in combination with cotton cargoes direct from Pensacola.

"Rails have been imported very largely, but here Great Britain's share is decreasing, while that of other countries, excepting France, is increasing, and as recent large contracts have been obtained, mostly by the United States, it is probable that 1898 will see a still less proportion of this trade in the hands of British makers. It has always been alleged that American manufacturers or the suppliers lost money over these rail contracts, but, judging by their persistent bidding for the business, this would not appear to be correct. Nails from the United States have practically driven out of the market those from Germany and Belgium, but insufficiency of packing has caused much loss on wire nails shipped overland by way of Pacific ports.

"The demand for kerosene is still increasing, about 6,000,000 gallons more than in 1896 having been imported. Stocks at the end of the year were not large. About 70 per cent. of the oil was American, 23 per cent. Russian, and 7 per cent. Langkat."

Commenting further upon the gains made by the United States in the sales of her products and manufactures to Japan, the report says:

"The appearance of the United States as a serious competitor with Europe was mentioned in the last report. In 1896 this was attributed to the prevailing depression in the States, but the same reason will not account for the continued growth of this competition in 1897, and other causes must be sought.

"In the first place, it would seem that the period of prosperity experienced in the States until about 1893 or 1894 ended with a considerable overproduction in every branch of manufacture. The depression which ensued brought about an era of economy and stimulated the development of labor-saving machinery and appliances of every description, and by their adoption the American maker has been able not only to meet the lower prices offered to him by his own countrymen, but in many cases to create a demand abroad by selling his surplus at cost price, and thus freeing the home market from any excess.

In the second place, the development of an export trade from the United States has been taken up by large combinations of varied interests, having as their object the collection and dissemination of such practical information respecting the world's requirements as will lead to an extension of commerce.

These institutions stand ready to furnish gratis all details with regard to the resources and industries of the States, and there can be little doubt but that this broad and comprehensive policy is of incalculable assistance to those concerned in American trade. Another point to be mentioned is the development of direct steamship lines from New York, whereas formerly goods were sent to Liverpool or London for transshipment to Japan with a loss of time and at a greatly increased cost.

"While the relative growth of Japan's imports from the United States shows a very large increase in recent years, the amount of exports from Great Britain has increased by a larger total value; but it must be borne in mind that the American invasion has only just commenced, that the ground has been prepared for large extensions in the future, and that unless some unforeseen changes take place the tendency will be toward encroachment upon the trade hitherto belonging to Great Britain. A glance at the figures given below will show how rapidly the import trade to Japan of the United States is growing, particularly in machinery, locomotives and railway material—articles for which the United Kingdom has hitherto held a monopoly.

"This portion of the report cannot be closed without a reference to the quick deliveries which can always be obtained from America. As an instance, English locomotive builders required two years for the delivery of an extensive order, while the Baldwin Locomotive Works turned them out at the rate of two a day and shipped the whole quantity within eight or ten weeks.

"Another case recently occurred where the English time for shipment of five locomotives was ten months and the price about \$12,000 gold delivered in Japan, and American makers offered to ship in fourteen weeks at about \$8,000 gold. The same specification was submitted to both countries. The time allowed for execution of orders by the Japanese buyer is always short, and the tendency is to make it shorter still. Consequently, prompt shipments are a great advantage, and when, in addition, the shortness of the rail and sea route via the Pacific coast is taken into consideration, it is apparent that the British maker must, even on the same terms as to price, offer strong counter inducements to insure successful competition.

"The total imports from the United States and Great Britain in 1890, 1895, 1896 and 1897 are shown as follows:

	From the United States. Yen.	From Great Britain. Yen.
1890.....	6,874,531	26,619,102
1895.....	9,276,360	45,172,110
1896.....	16,373,419	59,251,780
1897.....	27,030,537	65,406,266

"The following summary of the principal items which formed the United States' totals in these years will give an idea of the changes that have taken and are taking place:

	1890. Yen.	1896. Yen.	1897. Yen.
Kerosene.....	4,124,409	5,282,909	5,971,866
Raw cotton.....	351,875	4,252,398	7,273,221
Leather.....	223,549	815,057	498,277
Watches, clocks and parts of.....	327,401	333,852	421,473
Locomotives.....	48,588	416,106	2,393,385
Machinery and instruments.....	394,111	781,510	1,909,723
Steam boilers.....	30,314	54,869	211,790
Flour.....	226,769	984,021	1,152,318
Provisions.....	228,977	426,683	368,972
Rail and railway material.....	619	434,853	1,558,794
Iron nails.....	1,298	232,353	939,379

### American Automatic Car Couplers in England.

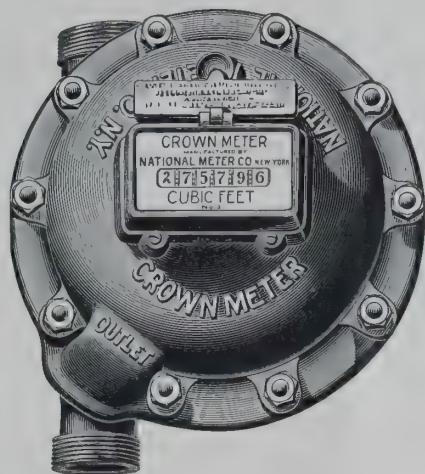
AN English friend has sent *The American Machinist* clippings from Birmingham papers which state that one of the features of the Barnum & Bailey show, now over there, that attracts most attention is not included in the show proper at all, but is the cars that have been built for transportation of the show from place to place. They are fitted with automatic couplings, and these seem to be attracting great attention and also general commendation. English "shareholders" and others are asking why English cars cannot be equipped with them, and are pointing out the advantages that would result from their use, especially in respect of decreased liability for accidents to trainmen.

A South African order for twenty anchors, 4,000 pounds each, has been received by the American Steel Casting Company, Sharon, Pa.



Interesting Information for Water Works Officials about

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[JULY, 1898]

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Yours very truly,

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Chairman of Water Committee.

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### Inventions of Thirty Years.

INVENTIONS of the first order have been very numerous during the past thirty years. The decade 1866-76 marks the beginning of the most remarkable period of activity and development in the history of the world. The *American Woodworker* enumerates the following as the most important of these: The perfection of the dynamo and its twin brother, the electric motor, by Wilde, Siemens, Wheatstone, Varley, Farmer, Gramme, Brush, Weston, Edison, Thomson, and others brought the great development of the electric light and electric railways. Then appeared the Bessemer process of making steel, dynamite, the St. Louis bridge, Westinghouse air brake and the midlings purifier and roller process in milling. The great chemist, Louis Pasteur, added his work to this period; the Gatling gun appeared; great developments were made in ice machines and cold storage equipments; machines for making barbed wire fences; compressed air rock drills and the Mount Cenis tunnel; pressed glassware; Stearns's duplex and telegraph, and Edison's quadruplex; the cable-car system of Hallidie and the Janney car-coupler; the harvester and self-binder; the tempering of steel wire and springs by electricity; the Low process for making water gas; cash carriers for stores, and machines for making tin cans.

With the next decade, 1876-86, there arose a star of the first magnitude in the constellation of inventions. The railway and telegraph had already made all people near neighbors, but it remained for the Bell telephone to establish the close kinship of one great talkative family, in constant intercourse, the tiny wire, sentient and responsive to the familiar voice, transmitting the message with tone and accent unchanged by the thousand miles distance between. Then come in order the hydraulic dredges and Mississippi jetties of Eads; the Jablochkoff electric candles; photography by electric lights; the cigarette machine; the Otto gas engine; the great improvement and development of the typewriter; the casting of chilled car-wheels; the Birkenhead and Rabbeth spinning spindles, and enamelled sheet iron ware for the kitchen. Next the phonograph of Edison appears. In this decade we find the first electric railway operated in Berlin; the development of the storage battery; welding metals by electricity; passenger elevators; the construction of the Brooklyn Bridge; the synthetic production of many useful medicines, dyes and antiseptics from coal tar products, and the Cowles process for manufacturing aluminum.

In the last decade, 1886-96, inventions in such great numbers and yet of such importance have appeared that selections seem impossible without doing injustice to the others. The graphophone; the Pullman and Wagner railway cars and vestibule trains; the Harvey process of annealing armor plates; artificial silk from pyroxyline; automobile or horseless carriages; the Zalanski dynamite gun; the Mergenthaler linotype machine, molding and setting its own type, a whole line at a time, and doing the work of four compositors; the Welsbach gas burner; the Krag-Jørgensen rifle; Prof. Langley's aerodrome; the manufacture of acetylene gas from calcium carbide; the discovery of argon; the application of cathode rays in photography by Roentgen; Edison's fluorscope for seeing with the cathode rays; Tesla's discoveries in electricity and the kinoscope, are some of the modern inventions which still interest and engage the attention of the world.

### "Counterfeit" Marine Engines.

IT not infrequently happens that a common vertical stationary engine is stripped of its base, balance and pulley wheel, governor, etc., and with a reversing gear substituted is offered the unsuspecting buyer as "a marine engine," although for obvious reasons this does not apply to large sizes. The "counterfeits" are easily detected even from an engraving or from the usual details of construction that any buyer can fairly insist upon having before ordering. For instance, "bottle" shape frames with crank shafts propped up high, rendering it difficult (size considered) to fasten the engine firmly in position or keep it "lined up," and practically impossible to prevent excessive vibration, while as to accurate counterbalancing, suitable steam passages for high pressure and resultant piston travel, adjustments for taking up the wear, etc., they all appear to be an unknown quantity. That such machinery, though short-lived, is troublesome during its existence is manifest.

Next in importance to the design of a genuine marine engine are the proportions of the working parts, such as crank, crank pin, connecting rod, etc. The better grade have the crank shafts slotted out from the solid steel forgings, including counterbalance and coupling flange in one solid, continuous piece—no building up or bolting on of any part. All wear on reversing link,

link block and link knuckles should be adjustable; every one of these adjustments being of value to the user on any reversing gear. Additional value is gained by having the locomotive reverse lever fitted by central connection to each side of the link, the direct central pull preventing lateral strain.

Although a customer may in good faith accept (along with a low price) a statement that "those little features are of no benefit except to talk on," the engine which lacks them enters a noisy protest before its first season closes and earnestly begs to be run slow, just at a period, by the way, when its well put up "neighbor is doing double duty without a murmur and making that little saving (?) in first cost appear somewhat irritating.

Even a poorly built engine in bad condition will be forced to run if enough steam and engineering talent are applied, but between merely keeping in motion and high efficiency there is a wide margin. Those of our readers who contemplate the purchase of machinery such as referred to will find it to their advantage to have the shaft, thrust bearing, stem bearing, stern tube, stuffing box and propeller wheel made by the engine builder, so that all parts will harmonize.

### American Hardware in South Africa.

A CORRESPONDENT of *The Hardwareman* (London), who is travelling in South Africa, has this to say of our hardware as he found it displayed in enterprising Cape Town stores:

"As to American tools, no one speaking impartially can deny them their meed of true merit, as the smart inventive abilities of our Yankee cousins, with regard to tools in particular, leave the Germans far behind with only their imitative faculties to back them. The colonial carpenters and joiners are very fond of the American pattern adze-eye hammer, also American planes, the advantages of the latter being manifest in this warm, dry climate, which causes wood to shrink and warp very soon if not well seasoned and used carefully.

"Then, again, the colonial tradesman is a progressive individual, and he feels a kind of brotherly sympathy with the new *chic* style of American productions. Their files and rasps are selling in increasing quantities, and many customers have told me that they prefer American machine-cut to English hand-cut files. A representative of an American firm was "doing" South Africa recently, and he made an especial point of giving every attention to new ideas and suggestions as to which styles of goods were most wanted and likely to meet local requirements. Does the average English traveller do this, or take any trouble on this most important point?"

### The Gas Engine as a Rival of the Steam Engine.

IT is scarcely more than a few years ago that the gas engine was looked upon by engineers as of no practical utility except for small power, and then under special conditions. In such instances the extra cost of fuel was more than balanced by the avoidance of a boiler and the less attention required. For the purpose named the gas engine came to have a very respectable backing and it stands its ground firmly to-day. It was not till still later that it was thought to be practicable to employ it for power of 100 to 200 horse-power, as it is being employed at the present time.

While it does not seem probable that the gas engine will, for large powers, supersede the steam engine or become a formidable rival, it is but fair to say there is a possibility of its doing so for the following reasons:

While it is true that heat and mechanical work are mutually interchangeable, it is equally true that the value of heat as a means of—the only means of—mechanical power depends upon the difference between initial and final temperatures. Power is had through the change from a higher to a lower temperature, and in no other way. The first of these statements is in accordance with the first law of thermodynamics and the second in accordance with the second law.

In the steam engine the initial temperature is that of the steam in the boiler, which, if the pressure (absolute) is 15 atmospheres—and it is rarely so high as this—is less than 400 degrees, and the final temperature is the temperature in the condenser, which is more than 100 degrees. The difference between the extremes of temperature is not great.

In the gas engine the range between initial and final temperatures is several times as great, and in this lies the possibility of greater economy. There are various reasons why this increased range of temperature cannot be utilized for power purposes, and while the objections may now appear to be unsurmountable, a way may possibly be found around or over them.—*The Tradesman*, Chattanooga, Tenn.





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With a cistern valve that can be regulated  
for any discharge,  
Every part constructed of best known materials and workmanship

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in sanitary appliances, made by

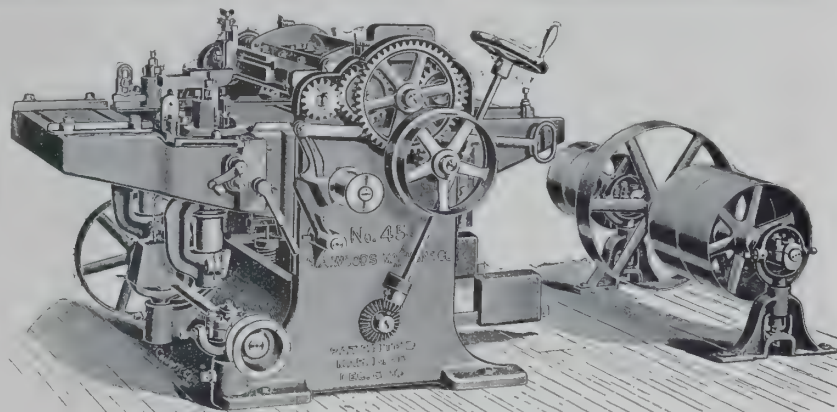
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is made of Galvanized Steel to insure against rusting. Nickel-plated Waste and Overflow. Enameled outside in light blue; inside is finished in five coats of Japan Enamels, baked on, producing a beautiful white, porcelain-like finish.

The Steel-Encased Tub is made of smooth rolled black steel jacket, lined with Sheet Copper, tinned, planished and polished to a mirror finish. Outside finished in light green enamels. Wastes nickel plated.

SIZES: Both kinds 4½ feet, 5 feet, 5½ feet over Rims.

WEIGHT: 115 lbs. to 130 lbs. in shipping crates.

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NEW JERSEY RED COPPER,

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A Perfect Substitute for Pitch.

NEW JERSEY PAINT WORKS,

HARRY LOUDERBOUGH, Proprietor,  
JERSEY CITY, N. J. U. S. A.

REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.  
MILLS EDWARD, Master Schooner "Florence Shay."



### Wages and Prices in America.

IN the rise or fall of wages and in the variations of the purchasing power of a dollar we have a phase of the monetary and industrial problem. In a recent investigation made by the State Bureau of Massachusetts some valuable information has been secured regarding the ups and downs of wages and prices in that State. The following table gives the weekly wage rate in such industries where the comparisons extend to 1872:

Average Weekly Wages.	1872.	1881.	1897.
Blacksmiths.....	\$16.44	\$16.38	\$16.00
Boots and shoes.....	12.71	11.06	11.90
Building trades.....	15.66	11.00	15.83
Cabinet making.....	14.21	11.51	13.02
Carpetings.....	4.89	5.94	8.26
Carriages.....	17.31	13.43	13.51
Clothing.....	9.71	10.90	9.01
Machinery.....	13.84	16.48	10.80
Metals and metallic goods.....	6.06	13.42	9.51
Paper.....	7.37	9.47	9.31

In commenting on this report the Springfield (Mass.) *Republican* editorially says:

"In six of the nine industries specified average wages are lower to-day than in 1872. Agricultural wages per month with board was \$23 in 1872, and \$18.50 in 1897. Cotton mill wages are given as \$7.59 weekly average in 1881 and \$7.71 in 1897, the latter returns having been obtained prior to the general 10 per cent. reduction of last Winter. Compared with 1881 wages are more generally higher, and this is true not only of the industries mentioned above, but of others such as the woollen manufactures, straw goods, stone cutting, rubber goods, printing and glass-making. In hosiery and leather wages are lower than 1881. Wages as a rule were lower in 1860 than in 1872."

These figures of course are more or less effected or modified by local or special circumstances, and are not conclusive as to conditions elsewhere. They are, however, in a general way indicative of the trend of wages in nearly all industries. The tendency in the majority of trades has been downward since 1872, with the added fact that more is being done for the same money now than then. Work is done under higher pressure, and the turnover of products is much more rapid and larger. This fact accepted, the vital point of the question lies in the increase and decrease of the purchasing power of the wage paid to labor.

In a tabulation of twenty-two articles of food, clothing and that of rent-age or housing, it is shown that the dollar of 1897 will buy more in ten cases and less in twelve than in 1860, but as compared with the prices of 1872, one dollar in 1897 will buy less in only one case. In some manufactured articles, such as boots, flannels, shirting, cloth, etc., the purchasing power of the dollar has largely increased, in some cases to twice its value since 1872. The conclusion reached by a fair comparison of wages and prices is, that as a whole, the toilers of the country are moving onward to a higher style of living, have more comforts at less cost than those of a few decades ago, are better clad and housed, and, in comparison with the industrial classes of some European countries, the American mechanic and laborer if not in clover is certainly not in straw. This is not saying that in some lines of industry wages are miserably inadequate, or the pressure of toil abnormally severe, or that wages and prices are not occasionally manipulated by unscrupulous parties for personal or corporate aggrandizement, or that the problem of the unemployed is less grave or menacing as heretofore. For all of this, however, the bulk of the people are moving in line to better conditions.—*The Age of Steel*.

### Accurate Screw Machine Work—Automatic vs. Hand Screw Machine.

THERE has been quite a controversy recently in the pages of the *American Machinist* as to the relative merits of automatic and hand screw machines. The following is so good a presentation of what may on the whole be regarded as the American side—for all of the champions of hand machines were Englishmen—that we feel that it will be of interest to our readers:

"Of course all automatic machines are not alike regarding speed of production and accuracy of product, and it is safe to say that nearly as much depends upon the operator of the machine and the designer of the tools as upon the machine, so far as quality of work is concerned. The very best machine with a poor set of tools and with the cams poorly designed or adjusted will make poor work. Some parts of the feed may be so fast as to require too frequent sharpening of the tools, making rough work and not within the gauge limits. For an operator does not like to disturb a machine

as long as he thinks the work will pass inspection. Then, if another part of the feed is too slow, the whole machine may be speeded up to get the product where it ought to be, dulling up the tools and producing rough work in consequence.

"To operate to the best advantage, all cuts should be carefully proportioned, so that the tools will last about an equal length of time, and not require sharpening more than once or, at the most, twice a day. Machines which have a set of cams for each screw or piece made are preferable, for if they are made correctly they can be put in the machine again with the certainty that they will produce equally good results and not depend on the skill of the operator.

"Under proper conditions more and better work should be made on automatic machines, because the feed is always regular, with no jerks. Who would expect to produce as good work feeding a lathe or planer by hand? And why expect better work from a hand-screw machine? An even, regular feed must have as much advantage in one case as in the other. There may be circumstances (such as using a small drill, when a skilled operator can match the drill for every hole and sharpen as often as needed) where a hand machine will do the most work, but such cases are a very small proportion of the work done on screw machines. If the turrets revolve too slowly, as mentioned in the article referred to, it may be the machine is not properly belted up. Some machines in this country certainly revolve their turrets faster than hand machines. There is also the same saving in feeding stock.

"Much, too, depends on the gauges used for the work and the system of gauging employed. Too much stress cannot be laid on the value of limit gauges, for nothing else is of so much assistance in getting out good work with different operators. A bright boy can feed stock in an automatic, and if in all cases the boy carefully gauges a piece of work each time a new bar of stock is put in the work will be good, unless pieces are very short or feeds and speeds too fast.

"One boy has in some cases attended to twenty-five machines, but this is doubtful economy, for the product per machine must be very low to allow this. In these cases a boy would be kept very busy running three machines, because of their being little work on each piece. A good system is to have one or more good men available, to grind and set tools, with bright boys to feed stock and test the work and, when not to the gauges, shut the machine down till tools are adjusted.

"There are certain screws which give a great deal of trouble on hand machines owing to the thread, their peculiar shape not leading the die on properly, and it being impossible for an operator to bring up the turret to just the correct speed. The angle of the thread in one case was 15 degrees from the axis of the screw. This was easily made on an automatic, because the cams were made to feed the die both on and off at just the correct lead. A similar result is usually obtained with the regular V thread, the size and pitch being more even on automatic machines. Many other examples might be shown wherein the product was better on automatic machines owing to the regular feed, and it is not an uncommon occurrence for an automatic to make from 50 to 100 per cent. more work. In one shop ten machines paid for themselves in less than eighteen months, and did the work of about twenty hand machines. In another shop one machine saved \$30 a week over buying the screws. I have yet to see work which cannot be made at least as good on an automatic as on a hand machine, and certainly some pieces, for the reasons given above, can be done better."

### The World's Copper Production and Consumption.

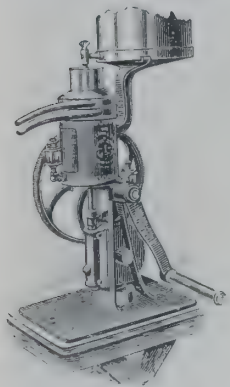
THE world's copper consumption is increasing at a very rapid rate, as is shown in the following estimate by Messrs. Aaron Hirsch & Son, of Halverstadt:

	1893.	1894.	Metric Tons. 1895.	1896.	1897.
Germany.....	60,513	62,955	70,349	85,371	96,385
France.....	33,886	31,837	40,323	49,007	58,336
England.....	96,615	90,069	91,084	115,557	110,210
Austria-Hungary.....	14,901	16,457	15,725	16,498	18,288
United States.....	77,443	94,511	108,000	93,698	101,404
Totals.....	283,348	295,829	325,401	360,131	304,652
World's production....	303,530	324,505	334,565	373,363	306,728

The last line of figures gives the world's production as estimated by Messrs. Henry Mason & Co. The English consumption of copper is still greater than that of any other country, while their percentage of the world's production is constantly decreasing. The United States now supplies 54 per cent. of all the copper produced in the world.



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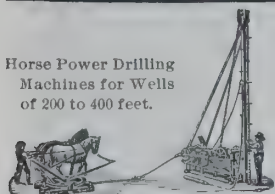
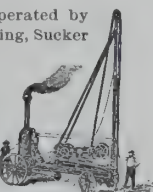
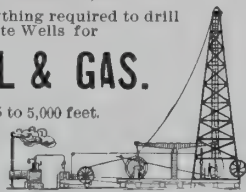
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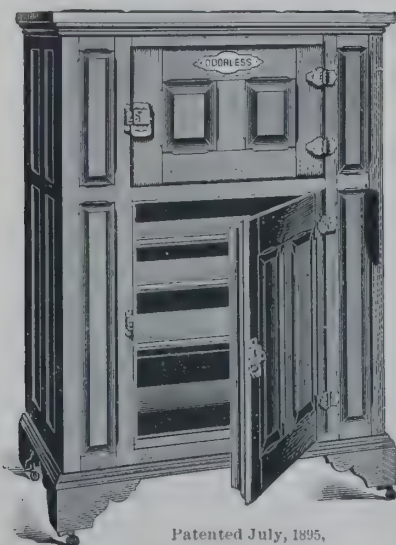
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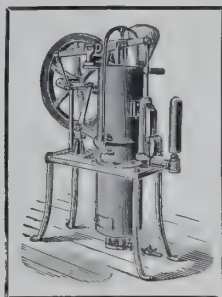
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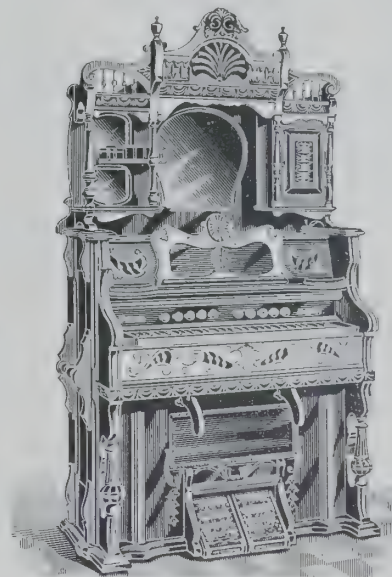
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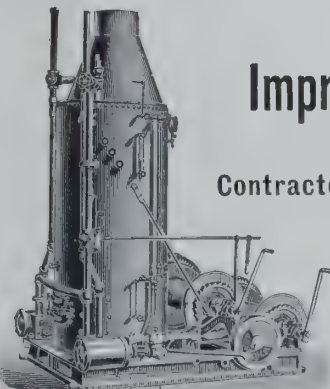
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### American-Built Railway in Corea.

**A**N American firm is now engaged in building the first railway in Corea. The contract was secured against British, German and Russian competition. The railroad will be 25 miles in length, running from the chief port of the kingdom, Chemulpo, to Seoul, the capital. It will follow practically the line of the old highway, over which all the traffic from the capital to the seaport has heretofore passed. Many deep rock cuttings will have to be made to allow the passage of the railroad. The River Han will be spanned by a steel bridge half a mile long.

This great bridge is now being constructed in the United States, and when it is completed will be shipped to Corea in sections. It will consist of eighteen spans, and will be an engineering job of considerable magnitude. The railway will be of standard gauge, and the contract calls for a complete equipment of the line, including stations, repair shops, car and engine houses, turntables, etc. The engines for the road have been built in Dunkirk, N. Y., and will be shipped out so as to be on hand to begin running the moment the rails are laid. An American firm is building the roadbed and equipping it with stations, repair shops, etc. The firm will also construct the telegraph line.

The building of this railroad from the seacoast to the capital of what a few years ago was called the "Hermit Nation" marks a great stride forward in the progress of Corea. In 1871 the Coreans fired on a surveying party from the American fleet because the party was taking soundings in the river, and in revenge Admiral Rogers landed a force of marines and blue-jackets which captured the forts and killed a large number of the defenders after a desperate hand-to-hand conflict. The flag of the Tiger Hunters, supposed to be the fiercest fighters in all Corea, now hangs in the museum of the Military Service Institution on Governor's Island, and an American firm is building Corea's first railway.

Corea made her first commercial treaty with the United States in 1882, the first one she ever made with a non-Asiatic nation. The United States may be said to have opened Corea to the commerce of the world, as she did Japan. Corea is reported to be a country of great mineral resources, and it must be only a short time, now that railroads have arrived there, before the hidden wealth will be exploited.

### Machinery and Labor.

**U**NITED STATES COMMISSIONER OF EDUCATION WILLIAM T. HARRIS, in *The Forum*, shows by tables compiled from the census statistics of 1870, 1880 and 1890 that there is a decided upward trend of labor from primitive, ill-paid employment to skilled service with higher wages. For example, in each million of our population employed in 1870 there were 11,360 individuals classed as mere blacksmiths and 14,744 other workers in iron and steel. In 1890 the actual number of blacksmiths decreased to 9,026 in a million of workers, while the machinists and other iron and steel artisans had increased to 21,831. That is, in rough figures, in twenty years the blacksmithing trade has lost 20 per cent., or 1 per cent. a year, of its laborers, while the iron and steel trades have gained relatively 50 per cent., or at the rate of  $2\frac{1}{2}$  per cent. yearly. Commissioner Harris contends that the theory that machinery is inimical to the best interests of labor is untrue. He claims, on the contrary, that invention brings comforts and luxury into the lives of all the people, and surely, if slowly, promotes the laborer from a digger in the fields earning bare necessities to a specialized worker with higher desires and the ability to gratify them. For the wise protection of individual workers the higher class of occupations labor. The physician for health, the lawyer to conserve property and personal rights, the officials of the Government to forward the public welfare; artists, musicians, authors and a score of æsthetic professions to provide necessary diversion and culture. These higher occupations are constantly increasing, and are recruited from the ranks of those crowded out from former avocations and selected for their greater versatility and power. Summing up the matter, the Commissioner says: "As fast as the supply of the lower order of wants can be effected by means of machinery large numbers press upward into these vocations which have to deal with intercommunication, the diffusion of science and the refinement of taste. \* \* \* Suppose that machinery should so far conquer drudgery that one person in each hundred by the aid of machinery could furnish all the food, clothing and shelter needed for the other ninety-nine, every one of these ninety-nine would find ample employment in the higher order of employments which provide means for luxury, protection

and culture. The discontent existing at the present time originates largely in the feeling that there is too much drudgery and too little time for science, art, literature and the contemplation of ideals. Instead of coming too fast, useful inventions are not coming fast enough."

### Large Freight Cars.

**T**HE recent introduction of freight cars of 80,000 pounds' to 110,000 pounds' carrying capacity brings up again the "large car" question, which is always a fruitful subject for discussion among railway officials of the operating and car departments. As is well known, the 60,000-pound car which has been for the last few years practically the standard, dates back only to about 1885. In 1875 the normal capacity was from 20,000 to 25,000 pounds, and in 1885 this normal capacity had grown to 40,000 and 50,000 pounds. In that year a committee of the Master Car Builders' Association made a report recommending certain standard dimensions for 60,000-pound cars, but such cars were then quite exceptional.

Few cars of less than 60,000 pounds' capacity are now built for ordinary freight service, but on the other hand there is a decided tendency to increase the capacity to 70,000 and 80,000 pounds. Several roads are now using cars of such capacity, including the Illinois Central Railroad. Even this is not the limit, however, for several hundred steel cars of 100,000 pounds', and even 110,000 pounds' capacity, are in service.

Practically all of those high-capacity cars are in use on roads having a large coal and ore traffic, and are intended specially for this traffic, in which they can be assured of full loads (in one direction at least), thus approaching to the full measure of economy due to large carloads. The Pennsylvania Company, the Baltimore and Ohio Railroad, and the Pittsburg, Bessemer and Lake Erie Railroad possess exceptional opportunities for benefiting by economy in operation in this way on their lines between the Pittsburg district and the Lake Erie ports. A large proportion of the traffic on these lines consists of northbound trains carrying coal to the lake ports, and southbound trains carrying ore from the lake steamers to the Pittsburg manufacturing district, so that the cars have full loads each way. The Pittsburg, Bessemer and Lake Erie Railroad has been specially improved for this traffic, grades having been reduced, 100-pound rails laid, and heavy mogul engines put in service which can haul loaded trains of thirty cars of 100,000 pounds' capacity.—*Engineering News*.

### Steel Structures and Heat.

**B**UILDERS of steel structures have been confirmed, incidentally, as to the adaptability of steel framed, fireproof buildings to withstand the effect of heat, by the recent burning of the great Shoeneman building in Chicago. This structure was seven stories in height and immediately adjoined the notable Old Colony building, some seventeen stories high, on the north side, and the Manhattan building, which rises sixteen stories, on the south. The heat to which the last mentioned two buildings were subjected in this ordeal was intense, and gave as fair and thorough a test in this respect as could be desired. The wall between the Shoeneman and Manhattan buildings was a party structure, and, when the burned building collapsed, it pulled the party wall one inch and a half out of plumb, where the greatest strain was sustained, but otherwise the Manhattan gigantic pile suffered no injury from heat or fire, except that some window casings were burned and fifty or sixty windows broken. The effect on the Old Colony building was even less, according to the report of the architects who were employed to make a professional examination.

**A Proposed Boycott of American Machinery.**—The French paper called the *Journal des Transports* calls attention to the reported boycott by American women placed upon French milliners, etc., and advises French railroads and "tram lines" to refrain from buying American machine tools and machinery and Westinghouse brakes. We feel free to say that if French users of machinery fail to give themselves the advantage of using American machines and "slacken their orders and finally suppress them altogether," as they are advised to do by our French contemporary, they will probably do themselves far more injury than they will do any one else, and it is probable that there is nothing that German and other European manufacturers would be more glad to see than such a systematic attempt on the part of the French manufacturers to hold themselves aloof from progressive influences.—*American Machinist*.

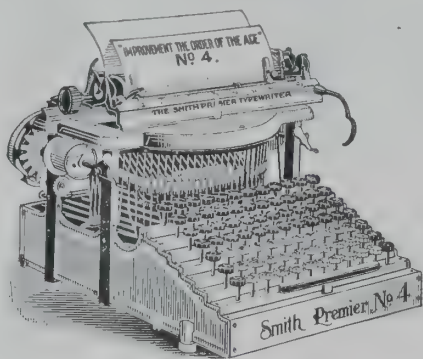


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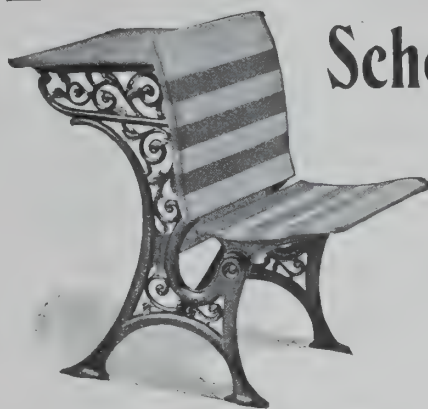
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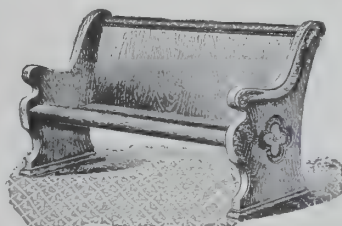
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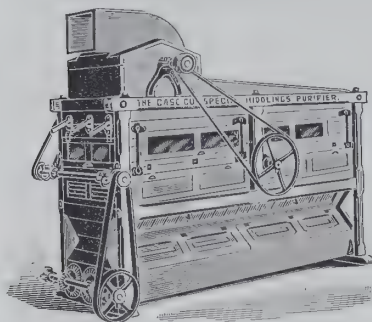
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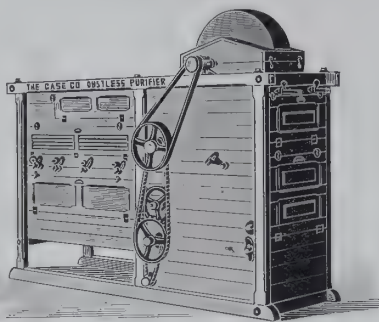


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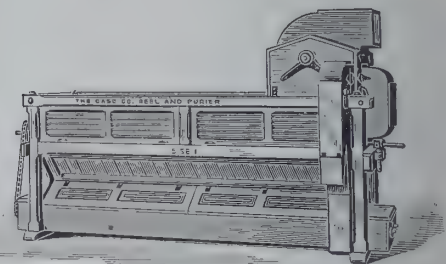
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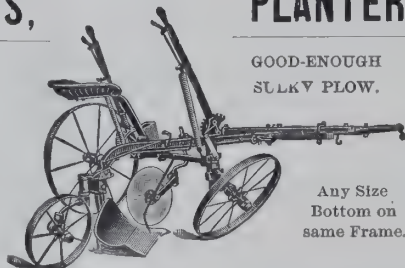
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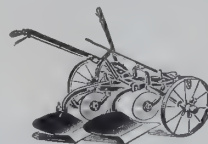


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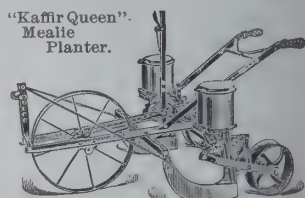


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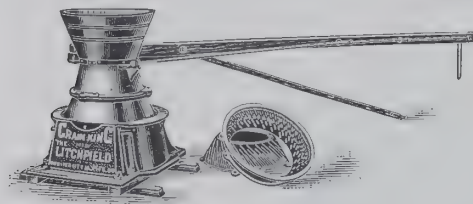
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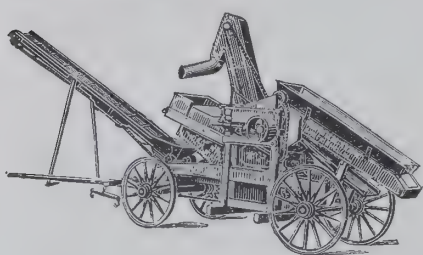


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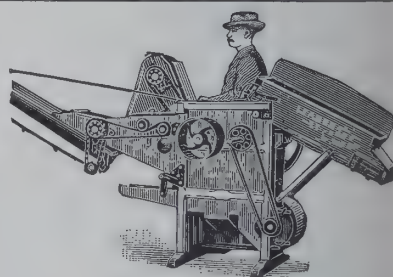


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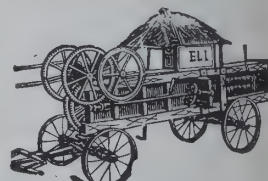
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### Agrarianism in Germany.

AMERICAN exporters of meat products cannot but regard with satisfaction the decline of the agrarian movement in Germany as evidenced by the recent elections in that country. It is hard to say at this writing to what causes this change of sentiment is due or whether it has any permanent basis, but certain it is that the domination of this party in the past has made the cost of living very high in Germany and imposed hardships on the poorer classes of the people, which could not prevail in countries where the usefulness of the ballot box and the franchise is free to exert its influence for the benefit of the whole people of every class.

The work of the agrarians—as the name implies—has been to hold the markets of Germany as far as they possibly could for the agricultural products of that country. This effort has no patriotic basis, but comes from the fact that those interested in this policy are land-owners and consequently dependent to a great extent on the outlet which they or their tenants can have for the products of their farms.

American competition, backed by quality and low prices, for many years has threatened the continuity of certain branches of German agriculture, such as the raising of cattle and hogs, and consequently has been used as an argument for the cohesion of German agricultural interests. The agrarian party is the result. Its growth has been considerable for some time and being made up, in the main, from people from the higher ranks of society, it has had no trouble in propitiating the government if not the Emperor himself.

In the wake of this has followed embargoes and restrictions against American products. These have been made and maintained on all kinds of absurd excuses, but no other conclusion has even been reached on this side than that they were the result of the agrarian movement and the desire of its exponents to keep the German markets for German goods to the exclusion of all others. Such a policy could not but result in the consumer having to pay higher prices for food, and it is probably this very fact that brought about the defeat of the agrarians in the late election.—*The National Provisioner*.

### The Windmill for Flour Milling Operations.

THE problem of harnessing the wind has engaged the minds of men for several centuries, and the success achieved is recorded in the history of every country, in fact, almost the very existence of Holland is due to windmills. There large areas of country were reclaimed from the ocean, and valuable service to various branches of industry were rendered by the use of the windmill.

Of course, ways and means of doing work change from time to time in the onward march of successive generations, but for one to say that the picturesque windmill is only a reminder of milling in the past is by no means true. Mankind has been busying itself during late years in developing, or attempting to develop, power from the hidden forces of nature by all kinds of means and combinations, and to a great extent abandoning the common forces of nature. This is excusable on the ground that heretofore these forces could be utilized only at the location where they were found, which in many cases was prohibitive of their use.

The discovery of the modern electrical machinery has solved the problem of power transmission and remote water-powers are now being successfully utilized. Through the same agencies, the windmill can solve the problem of cheap power for mills of small and medium capacity, and it may become as conspicuous as of old, especially in the rural districts. It may enable these small mills to successfully compete with the large ones.

As the modern reaping machines have retired the scythe, so modern windmills have retired those of old. Thousands upon thousands of small windmills are now rendering valuable service in pumping water. The latest development in the large windmills, whose regulating mechanism is operated by electricity, is in a fair way to become a prominent factor in the future of

flour-mill construction, as by the use of electrical machinery the automatic regulation of the sails is made a success.

Attempts have been made at various periods to harness the wind for milling purposes by the use of large automatic wind wheels, and had it not been for the erratic action of the wind these mills would have accomplished the desired results. The wind is a difficult force to harness, and to utilize its power machines must be constructed which are suitable in each case to the requirements of the work to be done. The writer has had an experience of twenty-five years in building and experimenting with all kinds of wind wheels, and knows well what construction must be employed to successfully meet the requirements of the various uses to which wind power is applied.

An important patent has just been allowed, and others are pending, on machines and means for harnessing the wind on a large scale. Therefore, the long-looked-for machinery for successfully utilizing the power of the wind in the operation of milling machinery may soon materialize. Not only will flour milling reap the benefit of this cheap power, but also other lines of industry in many localities where small power cannot readily be obtained or is too expensive.

Wind power can also be utilized for electric heating and lighting in all manner of places, as in lighthouses on the coast and aboard sailing vessels, where the power can be used not only for propelling the vessel but also for pumping, lighting, heating, etc. Nansen, in his trip in the Arctic Ocean, used a windmill to propel machinery for heating and lighting, but only in a crude way, as the account given of it states that the windmill was used until the gearing wore out.

A new era in windmill construction is dawning which, in connection with other machinery, will revolutionize, in many instances, the ways and means employed to operate machinery in the various branches of industry.—M. E. Schrock in *American Miller*.

### American Interests in China.

EVENTUALLY, as it now seems, nothing can prevent Russia from acquiring control of all the northern parts of China, while England and France are destined to advance from the south, and Germany and Japan will endeavor to secure spheres of influence in the populous provinces lying between. So far as the United States is concerned, the maintenance of the existing Chinese Empire is in nowise to be desired, if only the partition of China should not be followed by the adoption of commercial policies that would be prejudicial to our trade. Our treaty ports must be kept open to us on the present terms. We have a large commerce with these Chinese ports, and there is every reason to suppose that this profitable trade will, under normal conditions, have a very steady growth and attain in due time immense proportions. At present the great bulk of the Chinese trade is with England. English influence in China makes for the open and liberal policy that is most favorable for the United States. So far, therefore, as our sympathies are allowed to be governed by our interests, it is plain that we should incline toward the continuance and further development of England's influence and power everywhere in Asia. England has said plainly that she will not allow the continental powers to seize China for purposes of trade monopoly; and we must heartily join England in this righteous position. Neither England nor America could be benefited by grabbing Chinese territory; but both have an immense interest in Chinese commerce. Our acquisition of Hawaii would be directly useful in helping to keep open Chinese ports.—*Review of Reviews*.

**Paris Expositions.**—Paris's 1900 exhibition will be the sixteenth held in the city. The site of the first, in 1798, was the Champ de Mars, where 110 exhibitors showed their wares in wooden booths and twenty-five medals were awarded. Three successively larger exhibitions followed in the Louvre in 1801, 1802 and 1809. Under the Restoration there were exhibitions in 1819, 1822 and 1827, also in the Louvre. They became more popular under Louis Philippe, the number of exhibitors making it necessary to use first the Place du Carrousel and in 1839 and 1844 the Champs Elysées. The 1849 exhibition in the Champs Elysées required 2,200 square metres of space and cost \$120,000. The first international exhibition in 1855 brought about the construction of the Palais de l'Industrie, that has just been torn down, which was also used for the 1867 exhibition. The 1878 exhibition, with 52,835 exhibitors and 16,000,000 visitors, and that of 1889, with 55,486 exhibitors and 32,500,000 visitors, were held on the Champs de Mars.



### Some Interesting Wood-Working Industries.

THERE are a number of industries consuming but a small amount of timber which are yet important from an economic point of view, and as consuming woods that do not enter into the general lumber business. One of these is the making of insulator pins for telegraph, telephone and electric light and power wires. The pin itself, though a small affair, eight inches in length and perhaps an inch and three-quarters in its greatest diameter, should be well made and of a wood that will last under great changes of temperature and moisture, with a minimum of shrinking and swelling. It must be so little affected by dryness or moisture that the insulators, whether glass, India rubber or other non-conducting material, shall not work loose when once screwed down closely to the shoulder of the pin; and, furthermore, the pins must not shrink or swell enough to loosen. Otherwise there is constant danger of the line working loose through the slipping of the insulator from the pin, or the pin from the arm.

The world has been searched for just the right kind of wood for these small but important attachments. Various woods are used in different countries, but always one as near the description here given as is possible. White oak, chestnut, tamarack, white ash, hickory and others of the more common woods have been tried in this country, but all have been found wanting in some particular.

East of the Rocky Mountains there is nothing so nearly perfect for the purpose as the locust, or some related species. Common black locust (*robinia pseudacacia*), sometimes called yellow locust in the South, is the favorite, being the largest and most abundant. These species of the locust family have the common characteristics of durability and non-liability to crack when drying, and all shrink and swell but little with the variations of moisture in the atmosphere.

At present there is almost a monopoly in the use of these woods for insulator pins, and it is said that in the Virginias and North Carolina, where the black locust is abundant, no one can now buy a stick of it who is not connected with one certain concern.

There are other instances of a comparatively small industry almost monopolizing the use of a wood, conspicuous among which is the thread spool business, which practically monopolizes the use of all the white birch family, not only in this country, but in Europe, where however, comparatively little is produced. The making of the little bits of hardwood around which is wound the household thread is an important industry, engaging large capital and entirely dependent upon white birch. The business is almost confined to the northeastern United States—no mills, I believe, farther west than Michigan, in which State there are two or three factories. Whole shiploads of the rough squares from which the spools are turned are exported from the New England States, New Brunswick and Nova Scotia to England, the greatest thread-spinning country of the world. Though the white and gray birch reproduce rapidly in some sections, the new growth is but a fraction of the amount annually destroyed, and the thread spool industry must sooner or later take up another wood.

Weavers' shuttles now almost monopolize another American wood—the common persimmon. This wood was of little value until tried for shuttles and found to be peculiarly suitable. It is now a regular article of home commerce and of export.

There is a wood found in Oregon and Washington, near the Pacific coast, called bar maple, which is a great favorite with musical instrument makers, who considered it one of the best woods ever discovered, and at present nearly monopolize its use, its value having greatly increased since they discovered its availability. The wood is not a distinct species, nor even a variety, but is a rather uncommon accidental growth of the common maple of the Pacific region. It is nothing more or less than the curly maple with the curls arranged in bars at right angles with the grain, in nearly parallel lines and nearly equidistant from each other from end to end of the piece. Violin-makers claim that it is peculiarly adapted to their work, the curl or the arrangement of the grain after a sort of uniform pattern giving the wood a firmness and resonance found in no other. As a rule, the grain is practically straight in one direction, the curl being all in the other. This peculiar growth is simply a prank which nature seems to have played for the benefit of the fiddle-makers. Of course, this hard and solid and handsomely figured wood makes beautiful finishing and cabinet work, but it is so scarce that the musical instrument makers would be glad to control it all, and its value is such that it can hardly be used for commoner purposes except as thin veneers.

The making of sounding boards for musical instruments, and the frames in

which are inserted the pins that hold in place the fine, resonant steel wires of my lady's grand piano, or of the concert grand of the music hall, is immensely important in its way. This making of sounding boards led to the first quarter sawing of timber as a special industry in this country. Nothing more expensive in the shape of wood than good, sound white pine had ever been required until it was discovered, almost accidentally, years ago, that a sounding board with a vertical grain contributed especially to the fine tone of the instrument. For the frame, to hold the string pins of the piano, it has been but lately discovered that quarter sawed timber was the best. The aggregate strain upon the pins in a large piano is enormous, and, of course, being imparted from the pins to the frame, there is always danger of the latter splitting under it. There is no wood so well adapted to this purpose as good, solid rock maple, the sugar maple of the Northern and Eastern States; and it was almost accidentally discovered that this wood split less easily under the strain upon the pins when quarter sawed. Now the cutting and quarter sawing of maple, especially for these pin frames for pianos, is a business of itself, and, although not large, is still of great importance.—*The Tradesman*.

### Eighty Miles an Hour.

THERE is a steadily increasing rivalry between the New York Central and the Lehigh Valley in regard to the operation of popular fast trains—the Empire States Express of the former and the Black Diamond Express of the latter. Recently the Central people made public some interesting figures, showing the punctuality with which their train was run last year. Thereupon the Lehigh Valley people were moved to look up the record of their train for the corresponding period—the twelve months ended December 31, 1897.

It was found that westbound the Black Diamond arrived at Buffalo within five minutes of schedule time on 287 days of 313, or 92 per cent., and that the eastbound train made a similar good record on 290 days, equal to 93 per cent. of all the trips. The Black Diamond has a slower schedule than that of the Empire State, but, on the other hand, there are much steeper grades to contend with, the trains are usually heavier and there are more stops.

The schedule of the Black Diamond westward is 9 hours 55 minutes, including ferry between New York and Jersey City, and eastbound 9 hours 57 minutes. The distance is 447.53 miles, making the rate, including stops, but not the ferry (one mile), 46 1-3 miles per hour. There are ten stops, consuming about 30 minutes, and 19 minutes are allowed for the ferry. The eastbound train is scheduled at 63 miles an hour for 44 miles. On many occasions, when late, a speed of 80 miles an hour has been kept up for a distance of 20 miles or more, and on April 21, 1897, this rate was maintained for 44 miles, Alpine to Geneva Junction.

These trains consist of five cars each, and as the café car, 86 feet long, weighs 108,500 pounds, and the day cars 75,000 each, the whole train, exclusive of the engine and tender, must weigh something over 410,000 pounds. The locomotives which haul these engines weigh 140,900 pounds each. They have cylinders 19 by 26 inches, and driving wheels 78 inches in diameter. They have Wootten fireboxes, burning hard coal, and the average consumption of coal per train mile is 88 pounds.

The steepest grade encountered by the Black Diamond (eastbound) is 96 feet per mile for 10 miles. The train surmounts an altitude of 1,739 feet above the level of the sea.—*New York Commercial*.

### American Ordnance Machines.

A SIGNIFICANT item is found in the reports of an English ordnance factory, where 1,500 men are now employed night and day. The manager, who is an ex-navy officer, has been authorized to spend \$115,000 on new buildings and \$85,000 on new machinery. It is stated that the whole of the last sum will be expended in the United States, as the Americans only produce such machines as are wanted. All this new plant will be driven by electricity, an Ohio firm having got the contract for the whole of it. The machines are mostly vertical lathes, not obtainable in England. One of the novelties which the American firm is said to have disposed of to the English Government recently is a 6-inch gun, which, in consequence of the employment of a base ring of copper of a peculiar shape, pressing against a ring of asbestos, will show no signs of wear. At least, a gun from which 300 rounds had been fired, has its muzzle velocity reduced not more than 100 feet per second.



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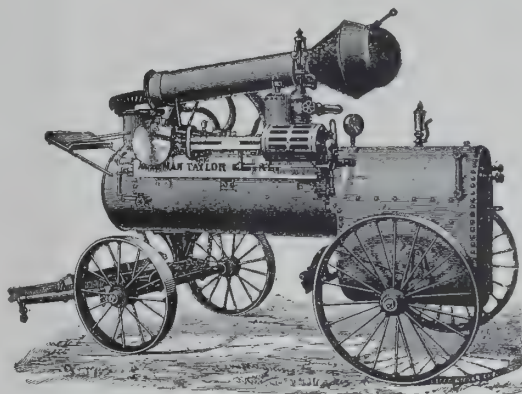
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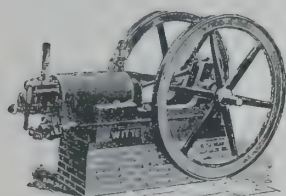
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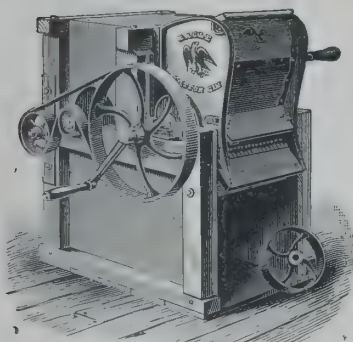


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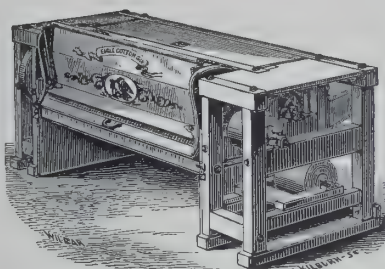
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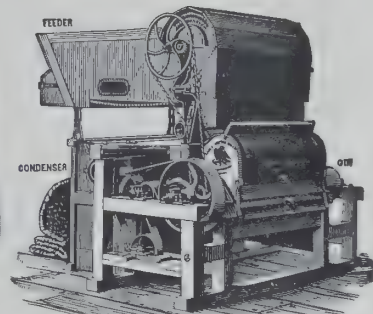
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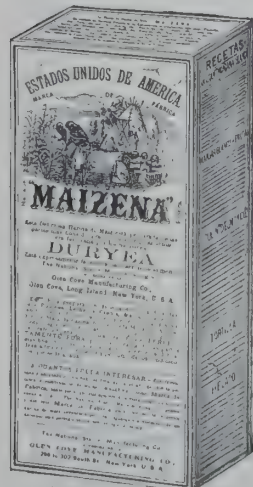
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Russia's Railway Policy.

A PART from political and strategical considerations, the onward march of the locomotive across the plains of Central Asia shows how great has been the progress of modern Russia in industrial affairs. Ten years ago the majority of the railway lines now either working or in course of construction, or now finally resolved upon, existed only in the brains of certain engineers, who were on all sides decried as visionaries; and although so late as 1890 public feeling in Russia went so far as to unite in claiming that steps should be taken to found home industries for the consumption of Russian products, yet no one then really believed that, before the century closed, there would be this new impetus given to railway building. To-day one may safely say without fear of contradiction that the busiest people in Russia are the railway builders. With the opening of the Trans-Caspian Railway in June, 1886, Russia planted a firm foot in the very heart of Central Asia.

Still more noteworthy for the Russian "railway policy" was the command uttered by the Czar Alexander III., in the same year, that the work of constructing the Great Trans-Siberian Railway should be taken in hand without any delay. There were two special reasons for this far-seeing decision. The first of these motives was that at the time of the difficulty in fixing the Afghan boundary, England had threatened to attack the port of Vladivostock in case Russia should descend upon India. This threat received additional force from the fact that the Canadian Pacific Railway was completed. The second was the desire to acquire the upper hand in the troubles occasioned by China on the borders of the Ussuri territory. During the two following years the plans for constructing this, the most important railway line that the world has hitherto known, were decided upon, and at the same time the construction of the Trans-Caspian Railway was so energetically carried forward that the first train arrived at Bokhara in March, 1888.

Outside Russia there is still a general idea that all Russian railways are of little value from a technical point of view. There may have been a certain amount of truth in this idea during the past, when hasty construction and an inadequate outlay of money very justly gave rise to the opinion that Russian railways were "cheaply and badly" made. Meanwhile, however, healthier and sounder principles have made themselves felt in Russia's system of railway construction, and the increased capital at the disposal of the empire has made it possible for it to employ experienced managers and workmen at a fitting rate of wage. The gradual formation of a properly planned system of railways in the distant portions of the empire has been most carefully considered by the authorities at St. Petersburg, for they recognize that Russia has a most vital interest in an unbroken and reliable railway service, which shall connect the most distant parts of the mighty empire.

The western world has been in many cases somewhat slow in fully recognizing the enormous internal development which Russia has made during the last ten or fifteen years. Matters have changed considerably since the days when the Emperor Nicholas, taking a rule, drew with it on a map of Russia a straight line as the course which should be taken by the projected railway from Moscow to St. Petersburg. In this case no attempt was made to take in the few towns lying anywhere near the route of the above-mentioned line, and hence this line of 404 miles passes, with one or two exceptions, through a succession of roadside stations. This line and the necessary rolling stock were almost entirely constructed by English and American engineers, and its subsequent management was for many years in their hands. But of late years steps have been taken to gradually replace these foreign officials by Russians, and the result has for the most part shown that, with a proper system of technical education, Russia bids fair to become in time independent of foreigners, especially in the construction of railways.—*Engineering Mechanics.*

Automatic Air and Steam Coupler.

THE successful automatic coupler for air brakes, for which the railway world has been looking more than fifteen years, and which ingenious minds have worked on ever since George Westinghouse invented the air-brake, at last appears to have been found and is to-day demonstrating its practicability and usefulness on a prominent Southern railway, says the *Atlanta Constitution*.

The automatic air and steam coupler is a device to couple automatically the air and steam hose connections on passenger cars or the air hose on freight cars. It has been demonstrated by long experiments to be what it purports to be. It is absolutely automatic and couples perfectly the air and steam attachments. If the cars couple the attachment couples, and if the

car coupling breaks the air coupler opens without injury to the attachment or the hose.

No one has to touch this coupler. When the cars come together the air, signal and steam hose all couple instantly and perfectly. There is no screwing together by hand or adjusting. There is no leak, and when it is desired to uncouple, the ordinary car coupling being released, the cars pull apart and the device is not strained in the least.

There is no exaggeration about this statement. The proof of it is to be seen every day in Atlanta's Union Passenger Station on the West Point passenger trains.

Similar couplings have been used on the Wabash Railway on one of its trains running out of St. Louis for several years, and these, too, have given thorough satisfaction and effected a great saving of expense in addition to the protection afforded employees against accident.

On a large railway system the cost of new hose for airbrakes, signals and steam hose aggregate thousands of dollars per month. Whenever a draw bar pulls out or a coupler is broken or train parted from any cause the air hose is destroyed or damaged. The life of air hose is short from constant chafing and wear, and, being easily removed, the losses in interchange are frequent.

With the immense increase in equipment of freight cars with air, under the requirements of the Interstate Commerce act, the expense of maintenance of air hose has become an important item in railway economics. With the automatic coupling there is practically no wear and no loss of hose couplings.

Without attempting to go into a detailed explanation of the mechanical design, it may be said that the attachment is fitted underneath the car coupler, of whatever make. As the cars come together a tongue on each attachment catches the other, a spring is forced open, two heads with parallel surfaces containing the orifices leading to the air and steam pipes come together and are held by a head and slot, under pressure of a stiff spring, a perfect adjustment is made, and the air, signal and steam connections are completely coupled. There are no complicated parts, nothing to get out of order, nothing to wear and no strain on any part to cause a break.

The merits of the device are that it requires no attention from trainmen, saves time in coupling, removes an element of danger from the work of the employees, and last, but most important of all in an economic sense, saves money by practically dispensing with the use of hose.

If the cars break apart the air uncouples without breaking any part of the attachment. If for any reason the air couples and the cars do not, the air device suffers nothing when the cars pull apart, and it will couple again when the cars come together. It makes no difference what kind of an M. C. B. coupler is attached to the cars, the air-coupler is self-adjusting and always comes squarely together. Placed with mechanical precision under the car coupler, the impact is borne by the buffers above, and the air attachment below gets only sufficient contact to make a coupling. No wear is apparent in the couplers which have been in use a year or more.

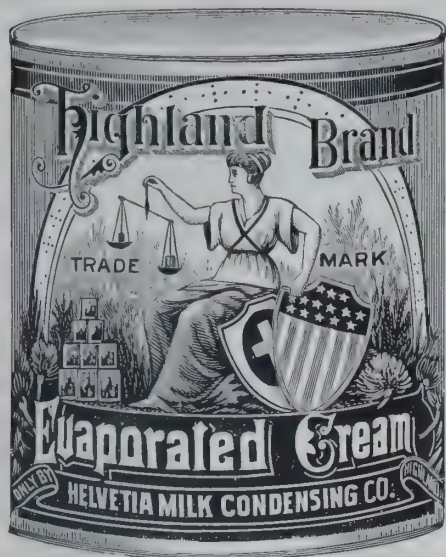
Japanese Imports of Steel Rails.

THE imports of steel rails into Japan, once largely from European sources, are now being reinforced by those of American make. In this matter the United States is dividing the honors with Great Britain, with the outlook sharply shaping itself that America will soon overtake its most formidable competitor. It is already leaving Germany and Belgium away behind, as the following table of steel rail imports shows:

From	Value.		
	1895. Yen.	1896. Yen.	1897. Yen.
Great Britain.....	866,443	2,028,542	1,626,726
Germany.....	19,649	100,303	170,303
Belgium.....	39,438	87,262	292,299
United States.....	.....	374,910	1,234,955

**More Orders for Steel Cars.**—The recent order of the Pennsylvania Railroad Company for 1,300 freight cars has acted as a strong incentive to other lines, especially coal and ore roads, to also adopt cars built of steel, the Baltimore & Ohio being one of the principal movers. Recent tests of the steel car have shown that the wooden one for heavy haulage will soon pass out of use. Some of the roads are now securing estimates with a view to placing contracts this year.





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- 6 doz. Unique Round End Medium Knives, 12 dwt.

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Dessert and Table Forks,  
Coffee Spoons,  
Fruit Forks,  
Sugar Shells,  
Butter Knives,  
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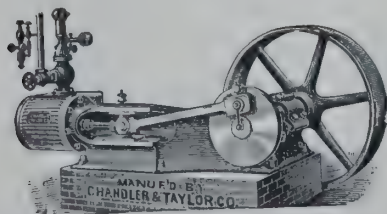
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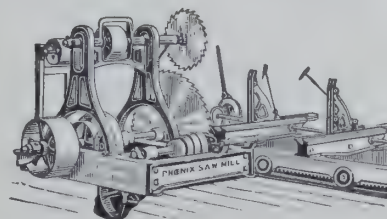
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OUR advice to dealers is to handle Bicycles that are mechanically correct in design—those that have all up-to-date features—no fads, but practical, new improvements that benefit both wheel and rider. Such are.....

**FRAME.**—Best quality of weldless steel tubing is used. Main frame, 1¼-inch; head, 1½-inch; lower rear stays, ¾-inch, D shape, tapered to ½-inch; upper rear stays, ¾-inch.

**FRAME CONNECTIONS.**—Flush joints.

**SPROCKETS.**—Steel detachable, 20, 22, 24 and 26 tooth front; 8, 9 and 10 tooth rear.

**HANDLE BARS.**—Steel adjustable.

**WHEELS.**—28-inch, fitted with steel piano wire swaged spokes.

**RIMS.**—Wood or steel.

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REGISTERED TRADE MARK.



**BEARINGS.**—Disc adjusting, made from best tool steel, scientifically tempered and carefully ground to remove any roughness caused by tempering.

**BALLS** are kept in place by ball-retainers, which, in connection with felt washers, serve as dust shields.

**OIL CUPS** are provided, which convey the oil direct to the bearings.

**HUBS AND CRANK-HANGER.**—Barrel pattern.

**WHEEL BASE,** 43½ inches.

**WIDTH OF TREAD,** 5½ inches.

**CRANKS AND SHAFT.**—Two-piece, joined in center.

**FINISH.**—Black, maroon or green, plain or striped and decorated.

**PEDALS** are made rat-trap, so constructed that rubbers can be attached.

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We also make HIGH-GRADE TANDEM and JUVENILE WHEELS.

## LIST PRICES:

IMPERIAL MODELS, Nos. 38 and 39, - - \$75 each. | IMPERIAL JUVENILE MODELS, 5 and 6, - \$40 each.  
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## SPECIAL DISCOUNT TO RELIABLE DEALERS.

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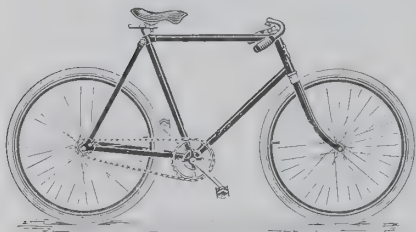
AMES & FROST COMPANY, “A” CHICAGO, ILL., U. S. A.



# Our Tribune Bicycles

# THE BLACK MFG. CO., ERIE., PA., U. S. A.

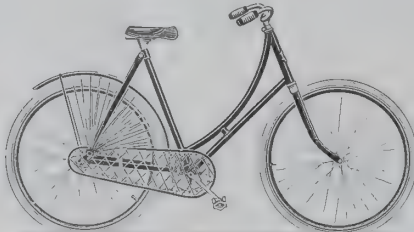
are known the world over for their excellent finish and reliable quality.  
Write for export prices. We deliver our machines properly boxed, freight prepaid, to New York City.



Tribune Model 33. Price, \$50.00.

Model 33 is a bicycle of excellent quality and finish, and far superior to many machines listing at higher price. The frame is weldless steel tubing of best quality, built in two heights, 23 and 25 inches; wheels, 28 inches diameter; gear, 73; cranks, 7 inches. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, gold striped, nickel trimming. Weight, about 23½ lbs.

ARENA MODEL M. Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 34. Price, \$50.00.

Model 34 is practically the same as Model 33, excepting that it is built with drop frame, 20½ or 22½ inches, for ladies' use. Weight, about 24½ lbs.

ARENA MODEL L is very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 350. Price, \$75.00.

Model 350 is built for road racing and for all purposes where a light wheel is desired. The frame is built in 23-inch height only. Drop to hanger, 2½ inches; 7-inch cranks; Tribune special single-tube racing tires. Weight, about 21 lbs. Finish, black, gold striped.

➡ We build also a large variety of higher-priced wheels, including TANDEM, TRIPLETS, ETC.

Handsome illustrated catalogue describing our full line, MAILED FREE.

# HALLADAY.

# AETNA.



Our line is complete, consisting of two grades, in both Ladies' and Gentlemen's Models. We will take pleasure in sending you our catalogue and quoting you our special export prices, which we are sure will interest you.

Our plant is one of the largest, best equipped and most economically conducted bicycle factories in the world. Situated in the great natural gas field and, therefore, under light expense, we have attained the well-deserved reputation for producing the highest types of modern cycle construction at prices with which few makers can successfully compete. Heretofore our capacity has been taxed to its utmost to supply the enormous demand for our wheels in America, but with greatly enlarged facilities we are reaching out, and it will now be the question of but a short time when our product must be as popular throughout the world as in America.

# MARION CYCLE CO., Marion, Ind., U. S. A.





### American Wood Rims.

THE discussion on wood rims that has raged so long on this side of the Atlantic seems now to have been transferred to the other, for we note frequent articles in our foreign bicycle exchanges on this ever-fertile topic for editorial treatment. In view of the fact that all authorities seem to agree that the wood rim is distinctively an American invention and that most rims, or the stock from which they are manufactured, come from this country, it may not be improper to devote some space to presenting a few of the reasons that have led American riders and manufacturers almost universally to adopt some form of wood rim, and a few facts regarding the types of rims most approved and used.

There are two types of rims in popular demand, these two styles being of a diametrically opposite character. They are popularly styled the laminated and one-piece variety. Both of these types of rims have been through a process of evolution for five years or more. In considering the comparative merits of the two styles, we must first consider the material used in their construction, and second, the process of manufacture.

The first experimental laminated rims were maple, and nine-tenths of the laminated rims made since 1892 have been constructed from rock maple. Nearly all the one-piece rims were at first made of elm. Manufacturers used them partly because they were offered them, always at a price lower than that of a laminated rock maple rim, owing to the increased cost of constructing the latter, and in part because the supply of the laminated rim was limited. Now, however, rock maple and to some extent hickory has supplanted elm in the manufacture of one-piece rims.

In both the laminated and the one-piece rim there has been a steady process of evolution not only in the selection of material and the care regarding the quality of stock, but in the process of manufacture and improvements in machinery. This branch of the bicycle industry in America illustrates what we have already mentioned editorially in *THE AMERICAN EXPORTER* regarding the specialization of industries in America. The manufacture of wood rims is no longer undertaken by firms making bicycles as a whole, but in every instance these important and delicate parts are made by firms who manufacture nothing else, except perhaps wood handle bars. Several of these firms are very large indeed, and possess well-equipped factories and employ large numbers of hands. The makers of standard bicycles naturally exercise the utmost care in the selection of the firm that is to supply the wood rims to be placed upon them, and this is a very easy and practical way for a foreign buyer to test the standing of any wood-rim firm he may wish to open negotiations with. If it makes the rims used on one or more standard makes it is all right.

The time has gone by when any old barrel hoop will do for a rim on a first-class bicycle. Paint covers a multitude of sins, and buyers will do well to have their stock finished in the natural wood. With caution as to the responsibility of the firm offering to supply these goods—for there are sharpers in every line—there is no reason why the progressive dealer may not have in this one feature a distinct advantage over his competitors. As between wood rims and metal there is simply no comparison whatever. The dealer has only to show them side by side to dispel whatever of lingering prejudice or sentiment there may be in favor of the metal rim.

### How Wood Rims Are Made.

A PROMINENT manufacturer of laminated wood rims describes in a recent number of *The Wheel* how a thing so slender, and seemingly so fragile, as a wood rim can be made strong enough to withstand the rough usage ordinarily demanded of it by the cyclist. Commencing with the strips of wood of which the rim is made, he says:

"As a very moist grade of steam is necessary to properly soften the wood without injury to the fibre, the strips are seldom left in the steam chests longer than two hours, and in the process of bending the softened strips in a well-appointed wood rim factory, bending machines are used.

These are built differently in different factories, and while not entirely automatic, they are run by power and do the work much more evenly than is possible by the hand process.

"Of course, a different machine is used on one-piece rims than is used for bending laminated rims, but we have improved machines in our factory for both styles of rims, and our machine for bending laminated rims has a capacity of 1,500 rims per day of ten hours; while in the one-piece variety we have two styles of machines, and, owing to the difference in the operations, the capacity is from six to eight or nine hundred rims per machine.

"Once glued, the joints are left until they set, or become perfectly dry and hard, when they go, in the best appointed factories, to automatic lathes, on which special cutters, made the exact shape of the rim, are used for molding the rims to their final shape, after which they are sanded or finished.

"The spoke holes are drilled in the rims by different styles of machines in use in the various wood rim factories. One, for example, is a machine on which rims are drilled by the operator pulling down the lever, thereby drilling two holes at one and the same time. But the most improved of these machines are automatic. The rim is placed on the machine by the operator; the machine is started, and unaided automatically drills the entire number of holes required at the proper angle and correct distances apart. When the machine has performed these duties it stops. In the meantime the operator has placed a rim on a similar machine, and, in fact, one operator can easily keep three machines in operation. It might be possible for one man to keep four in operation at times, but three are generally the limit. There is another style of machine which drills four holes at one and the same time; and the writer of this article has seen a machine on which the full number of holes on the entire rim can be drilled at one operation.

"Of course, in the complete process of wood-rim making there are many other operations not mentioned in this article. One might, for example, refer to the very careful manner in which the lumber is prepared for the steaming and bending process; or much might be said about the varnishing or finishing of rims; while, as a matter of information to the average reader, we might mention the vast number and styles of rims that we are called upon to manufacture, we making at the present time rims in all sizes, from 12 inches to 36 inches, and for all the different diameters of tires on the market."

### Putting Enamel on to Stay.

IT is altogether likely that from this season on considerably more attention will be paid to the finish of bicycles than has been the case for some time. The practice of using the same machine for two or more seasons is much more general than was formerly the case, and the chances are that it will extend still further. This being so, riders will become more exacting in their demands as to finish, and will insist on being relieved of the necessity of sending their machines to the shop each Spring, in order to have it done over. A bicycle that will not withstand one season's usage, no matter how severe, can hardly be considered to have the best possible finish on it.

Of course, this does not mean that all bicycles will be expected to measure up to such a standard. In fact, it is but a very small proportion of the total product that will. It should be remembered that it costs money to put on a good finish, and the buyer who will not pay the price asked for the best machines can hardly expect to receive the best enamel and nickel that can be applied to a bicycle. If he has any such foolish expectations it will not take very long to undeceive him.

As far as the enamelling is concerned the maker does not have such a very difficult task, provided his main object is durability. But even there it is not so easy to turn out thoroughly satisfactory work. The enameller can apply a covering that will not crack or flake, but such a finish will suffer more from scratches and knocks than if a harder enamel had been used. In such cases the enamel will come off easier—not under legitimate usage, of course, but when handled on railroad trains and other places where wheels come in close contact with each other. So it is not easy to decide which horn of this dilemma should be taken.

**Romanium for Bicycles.**—Romanium is a metal much discussed at present among bicycle makers. This new metal is a bronze composition, the invention of a foreigner, Dr. Roman, from whom it has its name. It is gold colored, about as heavy as steel and is twice as strong as ordinary bronze. In toughness and strength it is equal to cast steel and is non-corrosive. Dr. Roman's ambition was to perfect a metal for bicycle manufacture which would stand salt water, be impervious to rust, be capable of jointing without brazing, which would require neither enamel nor polish, and be the strongest metal for the purpose. This is what Romanium is said to be.



### American Armor Plate.

A LONDON correspondent of the *Iron Age*, after describing and analyzing various tests recently applied by the British admiralty to armor submitted by various American, English and European firms, expresses the conviction that the armor manufactured in the United States is fully equal to the best service armor yet manufactured abroad; that the tests as heretofore applied have been such as to secure a high standard, and that they are as severe as those heretofore applied abroad and represent more fully the actual quality of the armor supplied, more so than does the method of testing in vogue in England; that the armor presented in this country would have withstood tests considerably more severe than those to which it was subjected, and that the tests are and have been reasonable to the contractors, and so drawn as to carefully protect the interests of the Government. In the specifications recently prepared, which it is proposed to use in case of future contracts, a new table of velocities has been inserted, making the tests more severe than heretofore.

In testing armor in this country, the plates of a group are carried on together until all are carbonized; there is usually one more plate than the number required; the inspector at this stage selects the plate which, in his opinion, is the poorest of the group for the ballistic test. It is understood that in England a small plate or plates of the size and thickness submitted by the armor manufacturer for the standard of his manufacture, is carried along with the group, and such plate or plates are used for the ballistic test instead of one of the plates of the group, so that their test is not as representative a one as is ours. It is the custom for the armor makers of Great Britain to submit from time to time experimental armor plates for test. Such plates are tested by the admiralty, and those making the best records are adopted as the standards which must be reached by the manufacturer to whom a contract is awarded. This naturally leads to considerable rivalry among the armor manufacturers, and the extensive shipbuilding programmes always being carried on in England, and the natural desire for prestige warrant the expenditure of time and money to develop new and improved quality of armor, and while the manufacturers may combine to regulate the cost of armor for ships of the royal navy, as England builds ships of war for several foreign governments, the makers of what may be termed "champion plates" naturally stand the best chance for orders, both domestic and foreign; hence, the incentive to excel is very great. It will be observed that there is no fixed ballistic standard except such as is made by the test of champion plates.

In this country the conditions are somewhat different, the Navy Department having heretofore established the ballistic requirements for all armor manufactured, the last ones being based upon the de Marre formula for determining the velocities necessary to insure perforation of high carbon steel plates and backing, plus 15 per cent. for face-hardened armor. The specification for armor for the *Kearsarge* and *Kentucky* are based upon the foregoing, and the actual velocities used against the ballistic plates, representing groups of armor, are in the case of thick plates about 14½ per cent. lower than that required for perforation for the high-velocity shot, and about 35 per cent. less for the low-velocity shot; for thin plates the high-velocity shot is about 20 per cent. less than that required for perforation and about 30 per cent. less for the low-velocity shot.

### The British Iron Industry in the Seventeenth Century.

IN the year 1673 John Smith, gent., wrote a book entitled "England's Improvement Revived in a Treatise of all Manners of Husbandry and Trade by Land and Sea." Not the least interesting of its varied contents is the following comment upon the iron trade of Sussex, then the iron manufacturing centre of England:

"Much it is to be lamented that the devastation of woods threatens a greivous weakening to this Kingdom; such a pestilent heat issueth out of the many forges and furnaces for the making of iron as hath devoured many famous woods and by credible Report there hath been lately in Sussex above 130 Hammers and Furnaces for iron, the hammers and furnaces spending each of them, in every 24 hours, three or 4 loades of charcoal more or less, which in a yeare, amounteth unto an infinite quantitie, but because for lack of Water in the summer to blow their Bellows, all of them cannot work the whole year, we cannot give an account so exactly, yet a probable Estimate we may make how many load of Coale, all the said Hammers and Furnaces may expend in one Yeare; and to that end we shall suppose that one time with another they may all work two-third parts of the year, which is 243 days 8

hours: Each day containing 24 hours, or day and Night; and because all Hammers and Furnaces spend not a like quantity of Coale, we shall therefore take or compute the least or smallest number for all, which is 3 loades of Coale in 24 hours for each furnace and Hammer; Then there is spent in the 243 Dayes 8 houres, 1,460 Load by one furnace and Hammer, which amounts unto for the 130 Hammers and Furnaces 94,900 load in one yeare; Now if there were so many loades spent in one County, it is an unknown quantity that hath been spent throughout England."

### The American Round Cotton Bale Abroad.

THE new bale has recommended itself in short order to a pretty wide range of foreign cotton spinners and brokers. A firm at Bremen has already disposed of 1,125 bales made by the modern process; a house at Havre has handled a considerable quantity, and one broker at Genoa has placed more than 5,000 bales. The new way has now been well tested by European spinners at Albino, Abbiate, Bohmisch, Busto, Bremen, Bozen, Tyrol, Gazzaniga, Ghent, Gravelona, Genoa, Gross, Schonau, Hamburg Havre, Lanzo, Lovino, Mouza, Milan, Moscow, Naples, Palazzolo, Ponte sur Pietro, Prague, Pinerola, Palanza, Pessimetta, Rotterdam, Reval, Soci, San Germano, Chisono, Tournai, Turin, Theresianau, Vigavario, Vienna and Wisterchau.

Not one complaint has come in from anywhere. On the contrary, additional orders are getting to be the rule. The Societe Anonyme Cotonniere Nouvelle Orleans, for example, a Ghent concern, is one of several whose second order was double the size of its trial invoice. Niggerler & Kupfer, of Palazzolo San Oglio, tried 50 bales and then went to 300; while the Ditta Carlo Raggio Cotonificio raised slower—50 bales, then 100 bales, then 200, then 200 more. The round bale has indeed made its way.

Japan's first taking of 100 bales, through Frazer & Co., at Kobe, developed a recent order for a thousand bales, which the company had to refuse through its inability at the time to get ship room from the Pacific coast. In England, P. & G. Eskrigge, the well-known factors at Liverpool, have already handled a large quantity, whereof the final destination has not yet been communicated; and Liverpool houses generally are awakening to the merits of the round bale.

### McCullagh Police Signalling System.

ONE of the complaints, but not always just, in regard to a policeman is that you can never find him when he is wanted. Many measures have been taken to remedy this state of affairs, and resort has been made to the telephone signalling system, etc. Ex-Chief McCullagh, of the police force of Greater New York, who was in the service for thirty years, has studied this problem carefully, and has evolved a system of communication which marks a new departure in the police supervision of any large community. He proposes to establish a certain number of policemen at stated points all over the city, connecting their booths, or sentry boxes, up by telephone with the police station of the precinct. No matter what happens, any one who wants the help of the police can go at once to these well-known points and obtain the services of the officer there, he, in turn, notifying his headquarters of the call, and securing a relay, in the shape of one officer or a dozen, as the case may need. It will be obvious that such a system not only gives instantaneous police help, but by establishing a series of "trochas," makes it very hard for a fugitive criminal to break through, as he is liable to interception in whichever direction he goes.

One of these interesting booths was on exhibition at the Electrical Exposition in May, and the city of New York has recently made an appropriation to help carry out this McCullagh system.—*Electrical Review*.

### Nickel Aluminum Tubing.

SOME tubing recently made for a manufacturer of electrical instruments measured 0.036 inch in outside diameter, with walls 0.0015 inch thick. It is the lightest tubing ever made and runs 3,000 feet to the pound. Another specimen was a small piece of aluminum tubing 0.01 inch in diameter. The tube is so small that the hole through it cannot be seen with the naked eye, but it is really discernable with a magnifying glass. The drawing of nickel aluminum tubing shows great progress in working aluminum, for a few years ago the alloyed metal could not be drawn. A much stronger and stiffer tube is obtained by alloying with nickel.





The Best, Easiest-Running and Highest-Grade Bicycles on Earth Are the '98

\$75.00

"SYLPHS."

\$75.00

They contain more up-to-date and practical improvements than any other machines, and are acknowledged to be, both at home and abroad, the finest machines made.

They are ESPECIALLY adapted for Export Trade. We are appointing agencies in many foreign countries, and we want to hear from reliable agents in all countries. Our "Sylphs," together with a full line of "OVERLAND" Cycles, are money catchers, and you will make a mistake if you fail to write us before you contract.

"OVERLAND" Cycles, all sizes, all patterns, \$40.00 to \$50.00.

**ROUSE, HAZARD & CO., Manufacturers, Peoria, Ill., U. S. A.**

**L. C. SMITH GUNS.**

ALL BORED FOR  
NITRO POWDER.

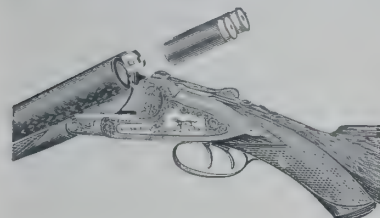
Guaranteed never to shoot loose.

8, 10, 12 and 16 Gauges.

We use Whitworth Fluid Steel, Crown Steel and Damascus Barrels.

Send for Catalogue.

We now put Ejector Mechanism on all our different grades.



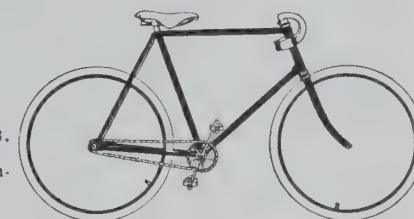
We also manufacture  
the CELEBRATED

"HUNTER" BICYCLES

which are unsurpassed for

Beauty,  
Strength,  
Durability and  
Easy Running Qualities.

These Bicycles embody all the latest improvements. Send for catalogue.



Fulton, N.Y., U. S. A.

**THE HUNTER ARMS CO.**

Fulton, N.Y., U. S. A.

## OUR WHEELS

are designed to suit the peculiar foreign climate.

THEY ARE STRONG, EASY RUNNING AND ELEGANT. STEEL RIMS, FRONT AND REAR MUD GUARDS AND BRAKES SUPPLIED IF ORDERED.

Write for trade and cash discount and for catalogues direct or through reliable commission house, with copy of order to us.

**LEAGUE CYCLE MFG. CO., - - Milwaukee, Wis., U. S. A.**

## IMPERIAL Bicycle Lanterns

ARE FAVORITES THE WORLD OVER.

**WHY?**

They will neither blow out nor jar out.

They are strong, safe, clean, attractive.

They produce a large, bright light. Are fitted with fine magnifying lense.

They are made from the very best material and possess positive merit.

MANY NEW FEATURES.

PRICES INTERESTING.

SEND FOR '98 CATALOGUE.

Manufactured by

**THE E. P. BRECKENRIDGE CO., - Toledo, Ohio, U. S. A.**



### Sterling Bicycle Bells

ARE THE BEST IN THE WORLD.

Made in all sizes and styles. (32 numbers.) Send for Catalogue "B."

**N. N. HILL BRASS COMPANY,**  
EAST HAMPTON, CONN., U. S. A.



### No More Rust.

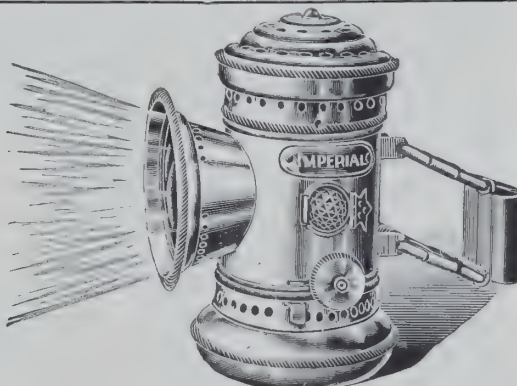
Our "Three in One" Lubricant  
Contains no Acid.

Prevents Rust on All Metals.

The only perfect Lubricant for Bicycles, Guns, Sewing Machines, Reels, Etc. Never gums or hardens. For cleaning Bicycles or Fire Arms after shooting. It has no equal. It is transparent and clean to use. Correspondence solicited. Send for Catalogue "C." Order through Export Commission Houses in this country.

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**G. W. COLE & CO., 111 B'way, New York, U. S. A.**

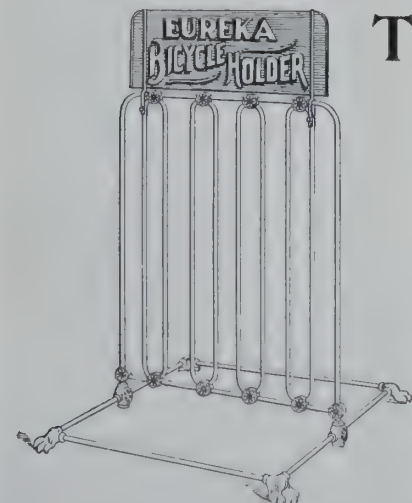


## The Eureka Bicycle Holder.

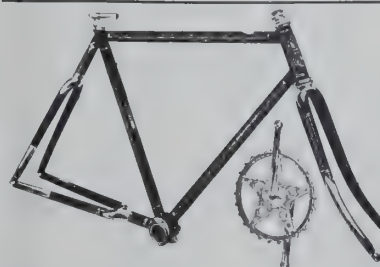
ALL IRON AND STEEL, combining strength, durability and neatness. Made with 5, 7 and 9 spaces, for lawns, indoors and sidewalk use.

SEND FOR CIRCULAR.

EXCELLENT MEDIUM FOR ADVERTISING.  
PRICES AND TERMS ON APPLICATION.



**OLIVER BROS., LOCKPORT, N. Y., U. S. A.**



"THE FINEST ON EARTH."

That's a broad claim to make for anything, but in the case of the

**MANSON 3 CROWN**

MODEL 33

it's but the simple truth, and there is no need to deviate from the truth.

The Several Reasons Why?

It is made of the very best material.

It is new and novel and eminently practical.

It has two rear crowns to match the front fork crown, causing the machine to be absolutely rigid.

It has an eccentric bracket at the hanger which facilitates the adjustment of the chain without using the rear chain adjusters, and is fitted with the one-piece Fauber crank.

The Thor Hubs are used and recognized everywhere to be the best.

The best swaged spokes, 14x16 size, are used.

Laminated or one-piece selected rock-elm rims, 1 1/4 or 1 1/2, 28-inch wheels, drilled 32x36.

The Peacock or Baldwin adjustable chain.

Head set, turned from bar steel, drop forging connections.

Seamless tubing throughout.

Dunlap tires. Steel adjustable handle bars.

Christy saddles. Record pedals.

Finest nickeling and enameling that can be put on a bicycle.

Frames, 22 and 24 in. high. Weight complete, 24 lbs.

Choice of gear. Ladies' frames are made same as gents, with exceptions of drop bar and chain guards. Height, 20 and 22 inches.

**MANSON CYCLE CO., 73-75 West Jackson St., Chicago, Ill., U.S.A.**  
Cable Address: "Manson."



### Bell Telephones in Use.

SOME idea of the popularity of the telephone in the United States can be obtained from the fact that a single company now has over a million in operation. According to the June monthly return of the American Bell Telephone Company the number of their instruments in use has crossed the 1,000,000 mark, showing there to be not far short of half a million Bell telephone subscribers in this country, and a gain of 85,000 subscribers since June, 1897, as the gain in instruments in that period has been 170,997. This must be admitted to be an enormous gain, the total number of instruments outstanding being 1,012,159 on June 20, as compared with 841,162 a year ago. Yet had the same annual gain been made during the past twenty years the Bell Company would now have 1,750,000, and the pasture for the new independent companies to graze on would have been correspondingly limited. It is early to determine any average or proportion of telephones to population in the United States, but there has certainly been a much nearer approximation to it the last year or two than ever before, as the result of the great stimulus to the industry given by what is known as the "independent" movement. Some of the rates quoted by these new concerns are amazingly low, but the mortality among the enterprises launched with such apparent recklessness has not yet been high by any means. It would be interesting to have their figures of net gain in subscribers as compared with the Bell during the past year. We should estimate it as fully equal, making an increase of 150,000 telephone subscribers for the whole country for 1897. Moreover, most of these have been gathered in from relatively small communities. There is no "opposition" in New York, Brooklyn, Philadelphia, Boston, Chicago and several other large cities, where the outcry against high charges has been loudest. Signs of it have not been wanting, of course, but the lack of it is due probably to the general satisfaction of the public with the service and the difficulty or expense of putting in a new system, with underground wires, able to compete with the service already intrenched and organized.

As things are, every indication points to a more rapid telephone growth than ever, and to success in the field based rather upon merits of apparatus and service than upon patents merely, or other passing influences of that nature. The public values the telephone highly, and is coming to depend upon it, and, having acquired the telephone habit, may be trusted to increase its patronage of the system at a growing ratio.—*The Electrical Engineer.*

### Growth of American Trade with China.

THE rapid growth of our commerce with China—a subject just now attracting especial attention—is shown somewhat in detail by a series of tables in the last number of the *Summary of Finance and Commerce*, issued by the Bureau of Statistics. These tables show that our exports to China in the year just ending will be about four times as much as in the fiscal year 1890, and more than three times as much as in 1895. The exports from the United States to China in 1895 were \$3,603,840, and in the fiscal year which ends with this month promise to be in round numbers \$11,000,000. But for the fact that there has been a reduction during the past year in the values of many articles exported the figures for the present year would be considerably greater than the sum named. The exports of mineral oils, for instance, have increased this year more than 4,000,000 gallons over last year, but by reason of the decrease in price the total cash value falls considerably below that of last year. In nearly all of the articles exported from this country to China there has been an increase in quantity in the fiscal year 1898 compared with 1897 or any preceding year. In bicycles, for instance, the exports to China for ten months of the present fiscal year amount to \$24,606, against \$11,444 in the corresponding months of last year.

In telegraph, telephone and other instruments of this class the exports for the ten months are \$22,374, against \$3,940 in the same time last year. Carriages and cars increased from \$1,632 in the first ten months of last year to \$28,603 in the corresponding months of this year; fruits and nuts, from \$13,004 last year to \$28,591 this year; canned beef, from 90,984 pounds in ten months of last year to 156,718 pounds in the same time this year; bacon, from 18,002 pounds to 30,375 pounds; hams, from 46,033 pounds to 58,859 pounds; butter, from 16,311 pounds to 20,085 pounds, and other articles in like proportion. In cotton cloth there is a reduction of about 12 per cent. compared with last year, though the total number of yards this year will be nearly double that of 1896, and more than three times as much as in 1895.

Our sales to China this year will show an increase of more than 300 per cent. over those of 1889, while our imports from that country show an in-

crease of but 35 per cent. in the same time. Our exports of merchandise to China in the present fiscal year are tenfold those of the fiscal year 1880, the total for that year being \$1,101,383, while that of 1898 is likely to be \$11,000,000 in round numbers. Our total exports to all Asia this year will amount to about \$45,000,000, being a gain of 10 per cent. over last year, more than double what they were in 1890, four times what they were in 1880 and more than ten times what they were in 1870. Of this total of \$45,000,000 about one-third goes to China (in part by way of Hong Kong), one-third to Japan and the bulk of the remaining third to India and the East Indies. In this calculation of distribution it is assumed that the bulk of the imports into Hong Kong, which are always heavy, are for China, the "Statesman's Year Book" saying of the business of that port that it is "virtually a part of the commerce of China."

The following table shows the leading articles exported from the United States to China in the last fiscal year compared with those of the preceding year:

EXPORTS OF DOMESTIC MERCHANDISE FROM THE UNITED STATES TO CHINA IN THE FISCAL YEAR 1897 COMPARED WITH 1896.

	1897.	1896.
Clocks and watches.....	\$31,242	\$13,058
Provisions.....	45,640	50,191
Wheat flour.....	72,100	45,815
Wood and manufactures of.....	113,499	154,945
Tobacco, manufactures of.....	229,956	192,138
Iron and steel, manufactures of.....	333,007	84,398
Mineral oils.....	3,371,937	2,166,978
Cotton cloths.....	7,438,203	3,854,146
All other articles.....	281,304	359,467
Total.....	\$11,916,888	\$6,921,136

The following table shows the total importations into China from all parts of the world by leading articles in the year 1896:

TOTAL IMPORTS INTO CHINA, 1896.

Cotton, raw.....	\$1,056,844
Flour.....	1,216,568
Ginseng.....	1,308,578
Machinery.....	1,668,078
Fish and fishery products.....	2,527,623
Coal.....	2,863,701
Woollen goods.....	4,333,420
Iron and steel, manufactures of.....	4,981,516
Sugar.....	5,667,318
Mineral oils.....	6,751,281
Rice.....	12,137,759
Opium.....	23,150,486
Cotton goods.....	64,028,692
All other articles.....	39,309,520
Total.....	\$170,991,384

The following table shows the value of our exports into China, Japan and all Asia since 1880:

TOTAL EXPORTS OF MERCHANDISE FROM THE UNITED STATES TO CHINA, JAPAN AND ALL ASIA FROM 1880 TO 1897, INCLUSIVE.

	China.	Japan.	All Asia.
1880.....	\$1,101,383	\$2,552,888	\$11,645,703
1881.....	5,447,680	1,468,976	12,917,348
1882.....	5,895,988	2,540,644	18,393,671
1883.....	4,080,322	3,376,434	16,348,742
1884.....	4,626,578	2,528,529	16,913,778
1885.....	6,396,500	3,057,415	20,739,972
1886.....	7,520,581	3,135,533	21,980,999
1887.....	6,246,626	3,335,592	19,322,172
1888.....	4,582,585	4,214,382	18,929,152
1889.....	2,791,128	4,619,985	18,439,626
1890.....	2,946,209	5,232,643	19,696,820
1891.....	8,701,008	4,807,693	25,553,308
1892.....	5,666,497	3,290,111	19,590,350
1893.....	3,900,457	3,195,494	16,222,354
1894.....	5,862,426	3,986,815	20,872,761
1895.....	3,608,840	4,634,717	17,325,057
1896.....	6,921,933	7,689,685	25,630,029
1897.....	11,924,433	13,255,478	39,274,905

The figures for the fiscal year 1898 will show a decided increase in our exportation to Asia, especially Japan; that to China may be slightly less than last year for reasons above indicated.

Twenty American electric street cars were recently delivered in Berlin, and 100 more have been ordered. They were wanted quickly, and therefore the order was placed with an American firm.



# BICYCLES!



## "ILLINOIS" BICYCLES.

Best bargains offered  
in Bicycles for 1898.

Spiral Screw Drivers.

Reversible Bit Screw Drivers.

One Hole Hand Corn Shellers.

Waffle Irons.

Serrated Edge Knives.

WE ARE THE WORLD'S HEADQUARTERS  
FOR THESE GOODS.

Paring Knives.

Mincing Knives.

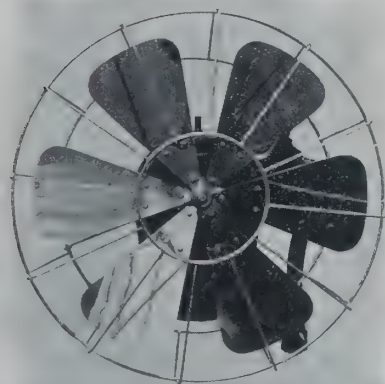
Meat Tenderers.

Can Openers and Hardware Specialties.

SEND TO ANY EXPORTER IN THE UNITED STATES, OR TO US  
DIRECT FOR OUR 1898 ILLUSTRATED EXPORT  
SPECIAL, GIVING NET PRICES.

## ILLINOIS CUTLERY COMPANY,

Decatur, Ill., U. S. A.



### THE Gem Water Motor Fan

Simple. Effective.  
Economical. Noiseless.

Novel in construction. As  
easily installed as an Electric  
Fan Motor.

LIST PRICE \$10.00.

Discounts for exclusive agents.  
Correspondence solicited.

Just the thing for supply  
houses to carry.

AGENTS WANTED.

THE SCHNEIDER MFG. CO.,

121 Euclid Avenue,  
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In ordering through export houses send  
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## THE GLOVER PERFECTION.



Designed with special regard for  
conformation to the human body  
in the sitting posture. Recom-  
mended by physicians.

Flat Coil Steel Spring.  
No Rebound.  
No Pressure on Soft Parts.  
Cool. Comfortable.

RETAIL PRICE, \$3.50.

Send for free descriptive  
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GLOVER CYCLE SADDLE CO., Jackson, Mich., U. S. A.

## BICYCLE HANDLE BARS.

Best Nickeled over Heavy Copper.  
Made 7-8 Tube Tops.

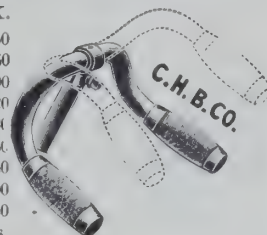
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Upturned, one doz. lots ..... \$10.50  
Drop, one doz. lots ..... 10.50  
Octagon Tube, extra, per doz. .... 3.00  
"Schinner" Bars, extra, per doz. 1.20  
One-inch Tube, extra, per doz. .... 1.20  
Ram's Horn, one doz. lots ..... 11.50  
Adjustable, one doz. lots ..... 13.50  
Anti-Vibration, extra, per doz. .... 3.00  
Seat Posts, per doz. .... 3.60

Any size stems. Discount to the trade on 100 to 50,000 lots.



Chicago Handle-Bar Co., 34 & 36 Market St.,  
Chicago, Ill., U. S. A.

## BERKEY'S ADJUSTABLE SPRING SEAT POST



Solves the Problem.

No bicycle complete without it. It  
will prolong not only your own life,  
but life of your wheel. Lateral  
motion obviated by tightening screw.  
In ordering give exact size of seat  
post hole. Will fit any wheel and  
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In ordering through export com-  
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THE BERKEY  
Adjustable Spring Seat Post Co.,  
Grand Rapids, Mich., U. S. A.

## — KNOCKED OUT — COMPETITION KILLED • BY OUR PRICES • GREATEST LINE OF BICYCLES ON EARTH THE AMERICAN BEAUTIES

10—MODELS—10

WINDSORS, NORTHFIELDS, WINFIELDS.

Catalogues for nothing. Write for our confidential offer, which will surprise you.  
In sending orders through export commission houses send us duplicate order.

The BROWN-LEWIS CYCLE CO., 300 Wabash Ave., Chicago, Ill., U.S.A.

## LENOX ANATOMICAL SADDLE.

"IT'S BUILT TO FIT."



FRONT VIEW,  
showing leather  
pad on steel  
base.

Two  
sizes:

Model C,  
8½  
inches;

Model D,  
10  
inches.



BOTTOM VIEW,  
showing steel base, coil  
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ments.

## LENOX Specialties

are famous the world over for quality,  
durability and price.

SUNDRIES manufactured by us  
are GUARANTEED.

Manufacturers, Jobbers and Dealers  
will be interested in our prices. Send  
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The LENOX MFG. Co.

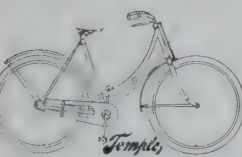
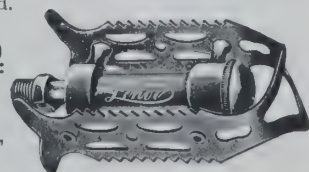
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Lenox Automatic Bicycle Bell.



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Temple



Temple Scorchers. Discount to agents, 50 per cent. List price, \$75  
Temple Special Discount to agents, 45 per cent. List price, \$60  
Temple Superb. Discount to agents, 40 per cent. List price, \$50  
Temple Faultless. Discount to agents, 35 per cent. List price, \$35

Best and cheapest line of Bicycles made in America.

Machines for Ladies the same price as for Men's.

Fitted with the best Saddles, Pedals and Tires.

Spanish Catalogues, and all letters written in Spanish.

TERMS: Cash in "New York" or "Chicago," to be paid us on delivery of complete  
shipping documents. Bicycles will be placed F. O. B. steamship at New York if  
desired, at no extra cost. "Send us sample order."

RALPH TEMPLE CYCLE CO., 204 35TH STREET,  
CHICAGO, U. S. A.



### American Carriages in England.

THE export of carriages and cars from the United States to the United Kingdom in 1897 was valued at more than twice as much as in 1887. The *Manufacturer* states that one of the reasons of this general prosperity in the American carriage trade is that the United States have a fundamental advantage in their splendid supply of lumber, and that American manufacturers have also the advantage of the brains of every nationality of Europe. In their workshops may be seen smiths from France and Sweden, trimmers from Germany, carvers from Italy and general artisans from England.

Another attraction is the higher wages which are paid in the States, being about double the rates paid in England and France, and more than treble those paid in Belgium, Austria and Italy. The Americans are famed for their wheel-making, and keep an enormous quantity of the best timber stored for this purpose. It is said that the favorite timber with them is second-growth hickory. When a forest has been burned or cut down the hickory tree grows up in a vigorous form, and the toughness and elasticity which it possesses renders it, when properly seasoned, most suitable for the manufacture of the American wheel.

The article quoted also states that there are already several London depots for the sale of American-made vehicles, and that there is plenty of trade for American manufacturers, but the needs and tastes of the people must, of course, be taken into account. A couple of years ago a firm of American carriage-makers shipped 1,800 carriages to Germany "in the white," i.e., ready for painting, and all in one year. What is possible in Germany is equally so in other European countries, even more in England, where there are no tariff hindrances.—*London Globe*.

### Spain as an Exporter of Iron Ore.

THE export of Spanish iron ores to Great Britain and countries in continental Europe makes its resources of that material of more than ordinary value to pig iron producers. Any embarrassment in access to these resources so far as over-sea trade is concerned, by the blockade of Bilbao, or the hindrance of production, such as may be a consequence of hostilities, might for a time seriously affect the iron and steel industries of dependent countries. In the case of Germany, which exports more iron ores than it imports, the effects would be less felt, though the figures for 1897 show an importation of Spanish ores amounting to 1,265,205 tons. Belgium imports considerable Spanish ores, and Belgian iron producers have considerable capital invested in Spanish mines. France, though importing heavily from Germany, imported 493,233 tons from Spain. Austro-Hungary imported 15,165 tons. Great Britain, however, is the largest consumer of the Iberian product, for out of an aggregate of 7,468,500 tons produced in 1897, not less than 5,067,148 tons went into British hands. Some concern has been shown by the latter country as to the foreseen exhaustion of ore from mines near the seaboard, and investigations have resulted as to what reserves there might be in the more remote districts of Hispania. Native iron ores in Great Britain of sufficient richness to meet requirements for certain grades of iron products are becoming less easy of access, and if Spain fails in its output other sources will have to be exploited. These may be found elsewhere, but in the meanwhile any obstruction to Spanish supplies would be a serious matter. It may not be that hostilities between the United States and Spain will last long, or if they do that shipments may not be very seriously embarrassed, but in these days, when the web of international trade is being so vitally and closely woven that a rent in the fabric at one point weakens or inconveniences the rest, a rupture in international relationships has more far-reaching consequences than many suppose.

### American Products in China.

UNITED STATES MINISTER CHARLES DENBY writes from Peking, concerning the opportunity offered in China for the extension of American trade, as follows:

"It may be said in general that the prospects for American trade with China are bright. Locomotives, machinery and mining plants have been largely imported during the past year. Manufacturers are taking occasion to be represented here by competent agents. It is believed that railroad supplies can be furnished from the United States at lower rates than from any other country. The era of railroad building has come for China, and the market is boundless. Day by day new ports are being opened to trade. The internal waters of China have been opened to steam navigation. A steamer

has reached Chungking through the Yangtse gorges. If the autonomy of China is preserved, there will be an immense development of trade, in which the United States will greatly share.

"The railroad progress of China has been so fully discussed that it is unnecessary to allude to it, except briefly. The road from Shanghai to Woon-sung is progressing. The Germans are to build two roads in Shantung. The Belgians still cling to the Hankow-Peking line. Yung-wing hopes to construct a line from Tientsin to Chinkiang. The road from Tientsin to Paoting-fu is progressing. The line from Tientsin to Peking is paying expenses already. The Siberian road will go to Talien-wan, and will have a branch to Peking. Other roads are in the air. Mining schemes are numerous. Much depends on whether the treaties are preserved and whether access is secured to all foreigners in Shantung and Manchuria, which Germany and Russia claim as their own sole preserves."

### American Trade with Japan.

OUR trade with Japan continues to make gains. For the ten months ending April, 1898, we imported from that country goods valued at \$21,700,730, against \$18,160,983 during the same period in 1897. We exported to Japan during the ten months ending April, 1898, merchandise of the value of \$17,126,289, against only \$11,233,594 in 1897. Here is a gain in ten months of \$6,000,000 in our export trade and \$3,000,000 in our import trade with Japan, though the balance is still against us. The chief gain in the exports is in raw cotton, from \$2,289,926 in 1897 to \$6,314,928 in 1898, the Japanese having found on our Southern plantations fibre supplies which are valuable to them in their cotton factories. Important increases are credited also to various classes of iron and steel manufactures. In our imports from Japan raw silk has taken a remarkable leap forward. During the ten months we received this article from the Japanese to the value of \$15,187,640, against but \$8,496,498 in the corresponding months of 1897. Our raw silk imports from all countries for the fiscal year so far are very extraordinary owing to the development of the silk manufacturing industry in Pennsylvania and in other States. The total imports in 1898 up to April 30 have increased to \$22,568,488 from \$14,840,542 for the same ten months of the fiscal year 1897. The comparative gains by countries are shown as follows:

	1897.	1898.
Japan .....	\$8,496,498	\$15,187,640
China .....	2,991,485	5,395,565
Italy .....	2,413,054	5,106,801
France .....	599,224	947,118
Other countries .....	340,281	932,863

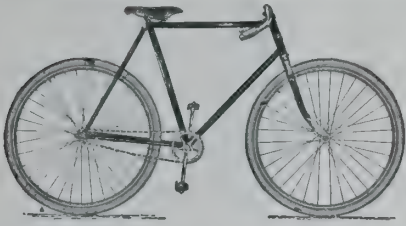
### Electric Fire Engines.

AN electric fire engine has been produced by an inventor in Indianapolis. The engine is made up of a rotary pump driven by a small electric motor and mounted on a reservoir. The pump draws the water from a hydrant, cistern, or stream in the same manner in which a steam engine operates, and forces it into the reservoir. Leading from this reservoir are a number of nipples, to each of which may be attached a line of hose. The wires for conducting electricity to the engine are wound on a reel mounted near the motor in such a way as to permit them to be readily drawn off and attached to any suitable source of power, such as trolley wires, electric light wires or established stations that every city would be obliged to put in on adopting electric fire engines. The advantages claimed for the new engine are compactness, lightness and the greater efficiency secured by being able to utilize a larger number of streams from a single engine. On the other hand a serious objection to the electric engine is the difficulty of securing a convenient and reliable current with which to operate the driving motor.

**American Building Stone.**—The value of various kinds of building stone produced in the United States in 1896 and 1897 was as follows:

	1896.	1897.
Granite .....	\$ 7,944,994	\$ 8,837,540
Marble .....	2,859,136	3,870,584
Slate .....	2,746,205	3,524,614
Limestone .....	13,022,637	14,640,341
Sandstone .....	4,023,199	4,065,445
*Bluestone .....	750,000	900,000
Total .....	\$31,346,171	\$35,838,524
*Estimated.		

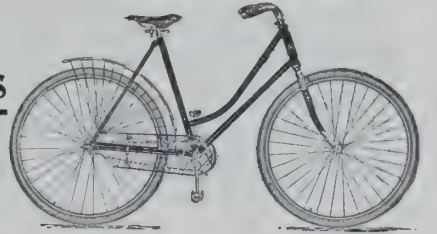




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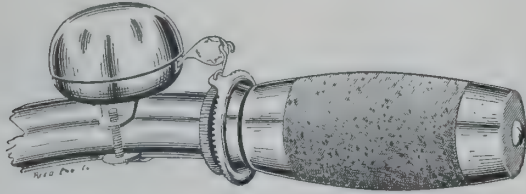


THE SOUDAN MANUFACTURING COMPANY, Successors to MASON & MASON CO.,

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CHICAGO, ILLS., U. S. A.

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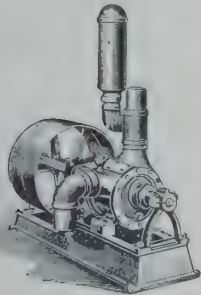


are as handy as a pocket in a shirt. They are New, Novel, Practical, Durable and never fail to operate on the impulse of the moment. The instant the hand is on the Grip you have full control of the bell, thereby insuring safety and convenience. Can be used on any standard handle-bar

without the slightest change; is adjustable and strictly high grade, and the proper thing for bicyclists to have. In ordering goods through export commission houses send us a duplicate of order. For further particulars address

NEI & DEAN, 419 Widdicomb Bldg., Grand Rapids, Mich., U. S. A.

## CARLEY'S STEAM AND BELT ROTARY PUMPS.



They run at a slow motion,  
Have positive suction,  
Are very nearly noiseless and self-priming.

Valve can be removed without taking off heads or pulleys. Will pump more liquor at a less number of revolutions than any other pump on the market. WE GUARANTEE THEM. Send for Catalogue A. Correspondence solicited.

CARLEY HEATER CO.,  
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ESTABLISHED 1870.

FOR BEST RESULTS

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# Baltimore Copper Paint.

It is Pure and Effective.

This paint is guaranteed to be a perfect protection to the bottoms of wooden vessels, for one year, when applied as directed.

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## Our Portable Pump

IN COMBINATION WITH

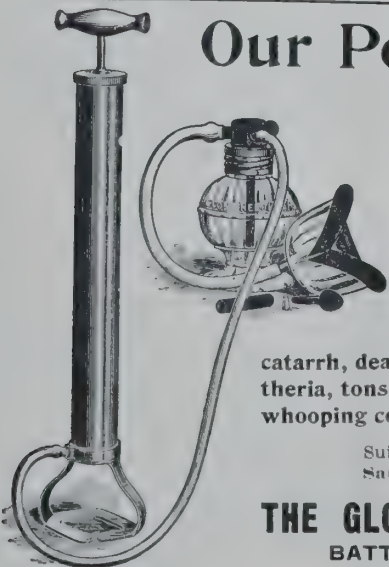
# THE GLOBE NEBULIZER

AFFORDS THE ONLY PRACTICAL  
TREATMENT FOR

All acute and chronic diseases of the nose, throat, ear, bronchial tubes, and lungs, including colds, catarrh, deafness, sore throat, hoarseness, diphtheria, tonsillitis, bronchitis, hay fever, asthma, whooping cough, pneumonia and consumption.

Suitable for both office and home use.  
Satisfaction Guaranteed.

THE GLOBE MANUFACTURING CO.,  
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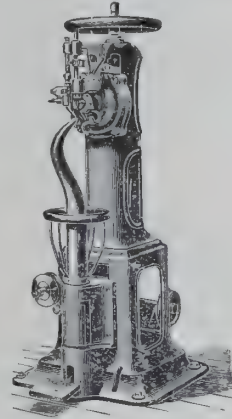
## GERMAN - AMERICAN MACHINERY CO., LTD.

ESTABLISHED SINCE 1862.

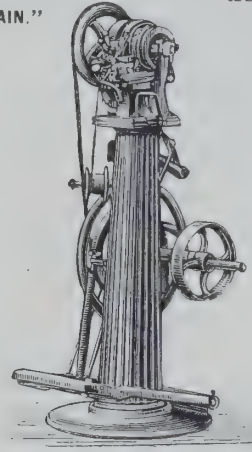
FRANKFORT o/Main, GERMANY.

Telegraphic address:  
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ABC Code and Staudt & Hundius  
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"Allianz" Lock-stitch Sole  
Sewing Machine No. 386.



"Albrecht" Lock-stitch Fair  
Stitching Machine No. 391.



Sewing Machine for Turned  
(Sew round) Work No. 392.

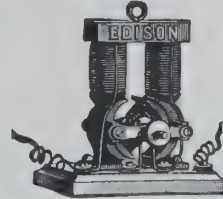
**SPECIALTY:** Machine and complete outfit for all Leather Trades for Boot and Shoe Factories, Shoe Upper Manufacturers, Tanners, Curriers, Belt Manufacturers, Army, Navy and Police Contractors, Saddlers, Harness Makers, Etc.

Catalogues in all modern languages, richly illustrated, and full particulars on application.

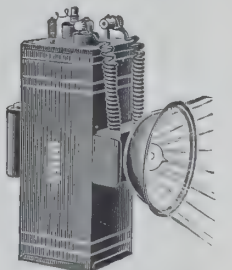
## The 3 Leading Electric Novelties.



Necktie Light.



Dollar Motor.



\$6 Bicycle Light. \$2.75

We undersell all on everything Electrical.

## OHIO ELECTRIC WORKS

CLEVELAND, OHIO, U. S. A.

HEADQUARTERS FOR ELECTRICAL NOVELTIES.

In ordering through export commission house send us duplicate order. Direct orders must be accompanied by draft on New York or San Francisco.

AGENTS WANTED.

CATALOGUES FREE.

## WOLVERINE MOTOR WORKS,

Grand Rapids, Mich., U. S. A.



Marine and Stationary Gas and Gasoline

## ENGINES AND LAUNCHES.

We manufacture Propeller, Side Wheel and Stern Wheel  
Launches. Send for Catalogue.





Devoted to the Foreign Trade in Electrical Appliances.

### Electric Power Plant in an American Coffee-Roasting Establishment.

ANOTHER up-to-date application of electricity to the solution of the power problem in factories is shown in the plant recently installed in a well-known Philadelphia coffee-roasting establishment. The power plant, which was designed and installed by another Philadelphia firm, consists of a four-pole generator of the latest type, for belted work, and eleven of the ironclad type four-pole motors, which are entirely inclosed. These motors range from 5 to 10 horse-power in size, and each motor is belted direct to its work. Under the old system that was in use in this building they could not have delivered more than 40-horse-power on the top floor, whereas they are now using more than 70-horse-power. The gain is, of course, in the transmission.

The coffee is brought to the top floor of this building just as it is imported from the foreign countries. It is full of dust, gravel and other foreign matter, which has to be separated from the bean. The coffee is first passed over a picking table, which consists of an endless canvas belt about 50 feet long, which travels at a low rate of speed, and each side of the table is lined with small girls, who pick out the foreign matter somewhat in the way that slate is picked from coal in the coal mines. The coffee then passes into a hopper through a conveyer, built by the Link Belt Engineering Company, which carries it to the milling machines, where all the dust, pieces of twine and any other substances which escape the picking table are separated from the bean, and the bean passes into receivers perfectly clean and graded, there being nothing remaining in the first grade but the largest and purest beans.

These beans are then carried overhead by a bucket elevator, which was also built by the Link Belt Engineering Company, and is emptied into a trough, which runs the entire length of the battery of roasting cylinders. Each cylinder is provided with a hopper, which holds one charge for a cylinder. Directly over these hoppers are slides worked by a lever, and as the hoppers need replenishing the opening is made and the conveyer drops the coffee in until the slide is again closed. The coffee is then passed from the hopper into the cylinder by opening a slide at the bottom of the hopper.

After being roasted, the coffee is dumped into a "cooling box," which consists of an iron box about 4x6 feet and 18 inches deep, and has perforated sides and bottoms. The cooling box is on wheels and is rolled under the cooling apparatus, which consists of a hood, which fits into the top of the box and sucks a strong blast of air through the coffee and out to the open air. In about a minute after the coffee is placed under the cooler, smoking hot out of the roaster, it can be pushed under the stoning machine and carried up to the bin overhead by the suction of air. This air draught is regulated to a nicety, so that it will leave all gravel or anything which may have escaped the other processes.

From the bins overhead the coffee is passed to the next floor below, where the entire sides of the room are taken up by galvanized iron bins for storage. From these bins the coffee is passed to the third floor, where it is received in bins and hoppers overhead and is weighed and automatically packed in 50-pound tin cans, which are crated, and in 1-pound paper packages, which have been treated with a process which renders them air-tight. The coffee is then placed on trucks which run directly onto the elevator and down to the shipping floor, and is immediately shipped out. The plan of the company is to prepare coffee just as they have orders for it, thereby furnishing their customers always with fresh goods. The capacity of their mill enables them to do this.

The elevator in this establishment is operated by a motor of the ironclad type, 7½-horse-power, and is reversible, driving direct on the winding machine, no countershaft being used at all. In the roasting department there are two 10-horse-power motors, each driving a battery of roasting cylinders, and installed in such a manner that the driving shafts of each battery join with a clutch coupling, so that in case either motor should blow a fuse or open a circuit the clutch can be thrown in and the other motor can take care of the load until the repairs can be made. Every motor in the

building is equipped with an automatic circuit breaker for overload and automatic release for current interruptions. There are three 10-horse-power motors connected direct to Sturtevant blowers. There are also motors of various sizes driving the milling machines, granulating mills, pulverizing mills, etc.

### American Copper Output in 1897.

THE demand for copper is showing an encouraging and perhaps remarkable activity. Its uses are being constantly multiplied, and along such lines of service as practically guarantee a steady and strong grip on the market. Europe has been and still continues to be a heavy buyer of the red metal, much of which is due to electrical enterprises. The same cause lies at the root of a strong home demand, though foreign shipments have exceeded home consumption.

According to statistics given in a late issue of the *Mineral Industry*, the output of copper in the United States for the year 1897 was the largest on record. The total as given was 510,190,719 pounds, an increase of 30,385,536 pounds over the output of the year 1896. Of the various States contributing to this unprecedented output Montana headed the list with a total of 237,158,540 pounds; Michigan being second with 145,839,749 pounds; Arizona being the third from the front with a total of 81,019,922 pounds. The following table gives the figures for both 1896 and 1897 for all States in the Union producing copper:

States.	1896		1897	
	Pounds.	Long Tons.	Pounds.	Long Tons.
Arizona .....	73,745,321	32,922	81,019,922	36,170
California .....	1,971,545	880	14,129,920	6,308
Colorado .....	9,539,245	4,259	9,437,663	4,213
Michigan .....	144,058,524	64,312	145,839,749	65,107
Montana .....	228,958,164	102,213	237,158,540	105,874
Utah .....	3,550,050	1,585	3,854,821	1,721
Eastern and Southern States	3,750,124	1,674	3,727,939	1,664
All others .....	2,050,000	915	2,018,929	901
Copper in sulphate .....	12,183,210	5,439	13,003,236	5,805
Total domestic production	479,806,183	214,149	510,190,719	227,763

Prices for the year 1897 scored a higher point than in the previous year, the average in New York being 11.29 cents in 1897, against 10.88 in 1896. In the world's production of copper for the past year the United States leads the list, with Spain, Japan, Chili, Germany and Australia in succession as named. Other contributing countries of less note and importance are Italy, Japan, Norway, Russia, Mexico, Bolivia, Canada, Africa, Sweden and Austria-Hungary. The total production of all countries is placed at 418,677 metric tons, or 31,470 tons more than in 1896.

These figures have been collated with painstaking care and are as close an approximation as can possibly be made with the facilities available. It would seem from the nature and strength of demand that the situation is not likely to change materially during the present year.

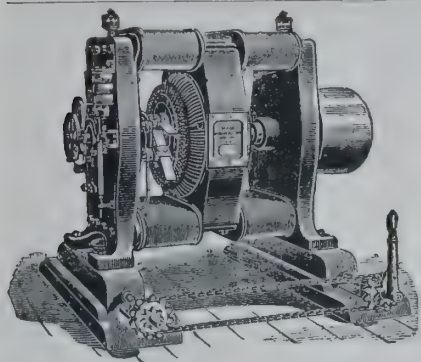
### Cutting Submarine Cables.

WITH reference to a statement made in the daily press, that if the United States interrupts telegraph communication with Spanish colonies Spain will retaliate by severing the cables between the United States and Europe, we desire again to point out in the strongest manner the futility of such an attempt, which would only result in injury to neutral property without effecting the desired object, and would inevitably lead to heavy claims for damages, to say nothing about the practical impossibility of breaking some twelve or thirteen cables before those first severed are repaired. We have it on the authority of one of the Atlantic companies that they have transmitted readable code words through a cable 500 miles long, broken about midway.—*London Electrician*.

### American Built Electric Railway in Cape Town, South Africa.—

One of the first up-to-date features of Cape Town which takes one's attention is the splendid service of electric trams which run between Wynberg and Sea Point, a distance of 13 miles, thus offering the best facilities for reaching any of the numerous suburbs. Such a lucrative concern as this would be naturally supposed to belong to the town, but no, an enterprising American contractor supplied the rolling stock and laid the tram lines, and a still more cute Yankee syndicate owns the whole plant. The cars are built on latest lines by a Philadelphia company, while the fittings and motors come from Schenectady, N. Y.—*Correspondent of The Hardwareman (London)*.





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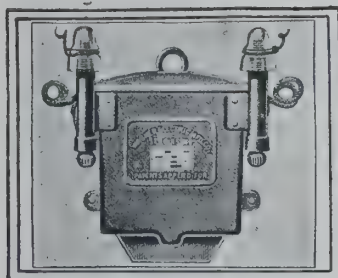
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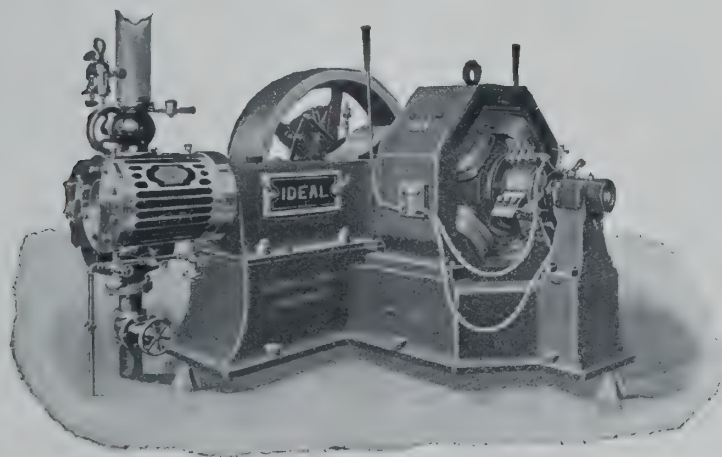
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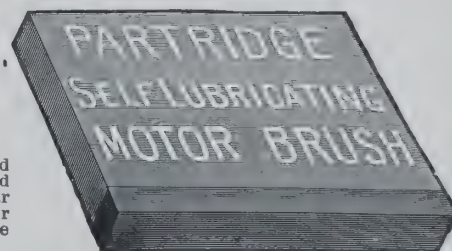
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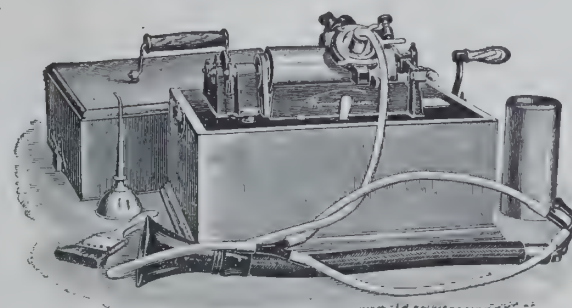
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### Prof. Elisha Gray on Electrical Progress.

WHEN I began my career as a so-called electrician there was no science of electricity. We knew nothing about ohms, amperes or volts, or any of those other peculiar terms which have grown up as the science has progressed. We had to do our experimenting just about as our mothers used to make cake. You know they did not have cook-books in those days, and they put about enough of this and that and the other together and made cake. Sometimes it came out good and sometimes it did not. If it failed, they did not know why it failed, and if it was a success, they did not exactly know why that was, either. That is about the way we had to conduct our experiments. We knew nothing about the relations of wires to magnets, resistance, etc. I remember when the first rheostat came into this country. It was a Varley rheostat with a differential galvanometer, and Charles H. Summers, of Chicago, electrician of the Western Union, had the first one. He used to carry it under his arm, and he was a great man. That was the beginning of ohms in this country—the beginning of the measurement of resistances. I have seen telegraph joints cut that gave a measured resistance of 35,000 ohms, and yet they worked through those resistances in those days, but it did not dare to mist or rain the least bit or the current was gone. We did not know then what was the matter with us.

I did not begin quite so far back as a certain professor of physics in my alma mater in its very early days, before the time of the telegraph, or at least before it amounted to anything. I do not think he had ever heard of it, but he was taking his class through a course of "electricity." It took him an hour one day. He showed the experiments of the frictional electrical machine, and talked to them about Franklin having caught the forked lightning from the clouds, tamed it and made it subservient to the will of man. You know how it goes—a regular Fourth of July speech; and then he said: "Young men, you were born too late to witness the development of this great science, electricity." I often wonder whether, if the good professor is allowed to look down from his far-off home and see the progress that electricity has been making since his time, he does not often think of that little speech he made to the boys over fifty years ago on the subject of electricity. I think I should, under the same circumstances.

We had no electric lights in those days, we had no electric railroads, we did not do our cooking by electricity, we did not read on the cars by electricity—those things were not thought of—we did not talk from town to town by electricity. I will quote a little poem as apropos of this subject, entitled the "Difference Between the Now and the Then:"

"In the olden time, along the street,  
A glimmering lantern led the feet  
When on a midnight stroll;  
But now we catch, when night is night,  
A piece of lightning from the sky  
And stick it on a pole.

"Time was when one must hold his ear  
Close to the whispering voice to hear,  
Like deaf men, nigh and nigher;  
But now from town to town he talks  
And puts his nose into a box  
And whispered through a wire.

"In other days we took a car,  
Drawn by a horse, if going far,  
And felt that we were blest;  
But now the conductor takes the fare,  
And sticks a broomstick in the air—  
The lightning does the rest."

As I said before, I congratulate you that you live in this age. I congratulate you that you can begin where you are beginning in this science of electricity. We are apt to speak of it as just on the threshold or just "in its infancy." Well, it is a pretty healthy infant; yet, who is bold enough to say that it is not yet comparatively in its infancy? I do not know what the outcome is to be, but I am sure we have not reached the end by a long, long ways. I expect—no, I do not know as I expect to see it—but I think some of you may see it, and, if you do not, some of your children will see the time when we will have done away with the steam engine, when we will take the energy which is stored in the wood and the coal, directly as electricity, without having to put it through the steam engine and the dynamo for the various uses to which it can be put. I say, I think that time is coming. It may not be reached in our lifetime, but it seems to me legitimate that we may look forward to that.

However others may differ with me, I look upon electricity as simply one form of energy, energy in one of its manifestations, as heat is one of the forms

of energy, and as light is one of the forms of energy, and mechanical energy, because we can transmute them from one to the other; we can make one take the place of the other; we can have it this to-day and to-morrow that, and why will there not be a discovery made by which this energy that has been stored by the sunbeam millions of years ago in the growth of wood and in the formation of coal beds—why can we not take that out and put it into the form of electricity directly, without having the cumbersome method of putting through the steam engine and the dynamo before it goes to the electro-motor. I ask why. I think we are coming to that some of these days and either this generation or, at farthest, the next will say good-by to steam. We will have no use for it. We will remember steam very affectionately for what it has been in the world and what it is to us now, but there will be no necessity for its use then.

I will not take up your time, but I thank you most heartily for this great pleasure that you have given me in being your guest from Chicago here. I thank you for all that I have learned from the contact with these young minds who have made electricity a study, and I shall always think of this occasion as one of the pleasantest of my life. *From an address before the Northwestern Electrical Association, at Duluth, June 14th, reported in The Electrical Review.*

### Loss of Power Through Using Tools and Machines Too Long.

THE English mechanical engineers are discussing the question how to induce proprietors of plants to throw out old machinery and put in new. An extra whack is sometimes given the slow-going Britishers when a new president of an engineering society steps in. Here is what the last one said at London, when the presidential crown was placed on his brow:

"Even to-day there are in use in mills, manufactories, steamboats and railroads, many old well-made steam engines which are costing in fuel from 25 to 100 per cent. on the outlay necessary for the introduction of modern engines. The gas engine is old enough now to make it worth while to scrap many of the earlier forms which are still working perfectly, except that they are consuming from 30 to 50 cubic feet of gas per horse-power instead of from 15 to 20.

"The reluctance of the conservative owners of old but wasteful machinery and plant is shown in many mills, where twice the necessary amount of power is used for mere transmission, where two machines are employed and have to be driven to perform the work of one, where boilers are costing as much every year for disincrustation, boiler compositions, and decreased evaporative efficiency as would pay 20 per cent. on the necessary outlay for condensers or for water softeners.

"We see this reluctance in factories where badly balanced machinery or machinery almost impossible of balance is consuming a lot of power in setting up harmful and annoying vibration in buildings, and we see it at many collieries where the products of the pits are sold at a price so much lower than that obtainable if those products were properly prepared for the different uses, that both colliery owner and consumer are losers of possible profit on every ton raised and consumed. We see it in the enormous waste of time and money by the use all over the country of double the horse-power that would be necessary for cartage if anything but antiquated notions prevailed as to construction and maintenance of roads and of the vehicles that run upon them."

### Testing the Strength of Steel Balls.

TO overcome all difficulties in determining the strength of hardened cast steel balls a German experimenter, Faepol, has devised a plan of testing two spheres together, each being imbedded carefully in plates bored out for the purpose, so that no damage could result except at the point of contact of the two spheres. This method proved reliable, for tests made thus gave a compression of five to six tons, while a half-inch ball of the same material placed between hardened steel plates, ran up to thirteen tons, and crushed into them one-fifth inch before breaking. The flattening of the balls was also observed, one of each pair being blackened before the test was made. By putting on constantly increasing loads and turning the balls to obtain new contact surfaces, interesting results were obtained. As the spheres tested were not of the exact size prescribed as standard for such work, experiments were made to arrive at comparative data. It was found that the accepted formula, according to which the apparent hardness is proportional to the cube root of the radius of curvature, gave concordant results.



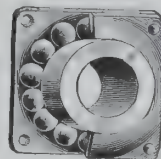
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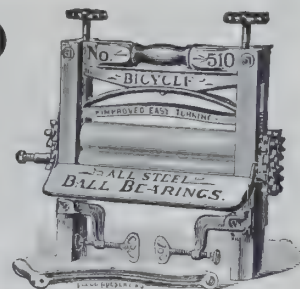
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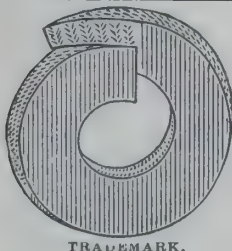


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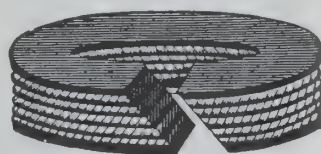
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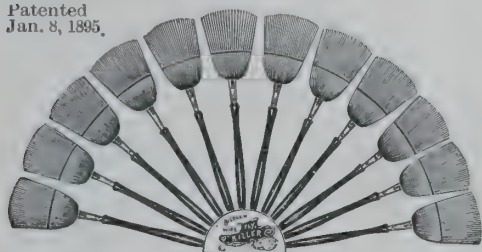
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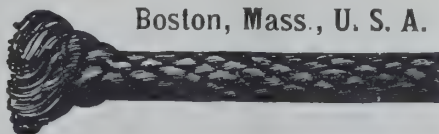
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## EXPORT NOTES.

The National Foundry and Pipe Works, Scottdale, Pa., have secured a contract for about 1,000 tons of 12 and 14 inch cast-iron water pipe for the city of St. John, N. B. This order was obtained from the Londonderry Iron Company, Limited, Londonderry, N. S.

According to a correspondent of the *London Iron and Coal Trades Review* 1,000 tons of steel ship plates—each upward of 2 tons in weight—have just been delivered at Belfast, per steamer from Baltimore. These were rolled at Messrs. Carnegie's works, and represent the first consignment of American plates that have reached Belfast.

A. D. Quint, 8 Clinton street, Hartford, Conn., manufacturer of Quint's turret drills for drilling and tapping, reports that he has recently shipped several of these machines to the French Government, also a number to other foreign countries.

The West End Rolling Mill Company's chain works at Lebanon, Pa., have entered a large order for their special high-grade chains for the Russian Government. They report export trade quite brisk, having recently made shipments of chain to China, Japan, Honolulu and various South American countries. Arrangements are also being made to ship their chains to England.

The Railway Cycle Manufacturing Company, Hagerstown, Ind., has received cable orders from Russia for a quantity of inspection cars. Lately this firm has made some good-sized shipments to Mexico, Peru, Germany and China.

I. Irving Benedict & Son, Haverhill, Mass., recently shipped between 3,000 and 4,000 pairs of shoes to foreign orders, and have several large orders yet to fill. This firm is one of the pioneer Haverhill concerns to compete in foreign markets.

During the past month the Smith Premier Typewriter Company, Syracuse, N. Y., has made shipments of its machines to the following points: Copenhagen, Denmark; Buenos Ayres, South America; Goteborg, Sweden; London, England; Geneva, Switzerland; Sydney, Australia; Cape Town, South Africa; St. Petersburg, Russia; Mexico City, Mexico.

The works of the Maryland Steel Company at Sparrow's Point are busy with large orders for steel rails for foreign railroads. An order for 40,000 tons for the Russian Government is now being shipped, and other lots will be sent to Brazil, Australia, India and other countries. The rails for Russia will be used on the new Trans-Siberia Railroad, which is to stretch across the dreary wastes of Siberia and connect Russia with the China Sea. They are of the heaviest pattern and are smoothly finished. Three steamers are now at Sparrow's Point loading rails for Russia. They are the British steamers Knight Companion and Mathilde and the Norwegian steamer Tiger. They carry about 5,700 tons of rail each, and will be 65 or 70 days reaching Vladivostok, passing through the Mediterranean Sea, Suez Canal, Arabian Sea, Straits of Malacca, China Sea and Japan Sea. The British bark Algoa Bay is loading rails at Sparrow's Point for Australia. The British steamships Dulwich and Cabral are now on their way from the Point with cargoes of rails for Vladivostok, and the British steamship Queen Christina is on her way to Melbourne with a similar cargo. Several cargoes have been shipped to Bombay and Calcutta, as well as Mexico, Jamaica, Nova Scotia and Brazil.

The Westinghouse Company has made a contract to equip the cars of the Manchuria Railway Company, of Russia, with air brakes, and a plant is to be erected near St. Petersburg for their manufacture. The amount of the contract is between \$2,500,000 and \$3,000,000. It is believed to mark an event in the adoption of these brakes throughout Europe and Asia. The company already has a plant in France, the establishment of which has brought contracts for brakes to the amount of nearly \$5,000,000.

A complete electrical equipment for underground and surface street railways of Paris will shortly be shipped by a well-known Pittsburg firm. The order is a large one, and comprises machinery for both power and lighting.

The Philadelphia Engineering Works have just shipped to Mexico a large consignment of heavy pumping machinery for use in the Rincon y Anexas mines of Temascaltepecas, which are operated by the firm of A. Munuxwa & Co. This plant will be, it is said, the first of its kind to be erected in the Mexican Republic.

The Brooks Locomotive Works, Dunkirk, N. Y., are reported to have an order for five locomotives from the Chihuahua and Pacific R. R. (Mexico), making a total of ten ordered by that railroad from this company recently.

They report having just shipped five locomotives to this railway—one passenger 18x24 American type and four 18x26 consolidation type freight—and have under construction for the American R. R. and Lumber Company of El Oro, Mexico, two 16x20 3-foot gauge consolidation locomotives. They have also received an order from the Hankaku Railway of Japan for three passenger engines, 14x24, and two side-tank freight engines, 15x22, and also from the Nankai Railway for four 15x22 6-wheel, double-end, side-tank freight locomotives.

McIntosh, Seymour & Co. have booked orders for two 700-horse-power horizontal cross-compound electric railway engines to be used in the City of Mexico. They will be directly connected with two 452-kilowatt General Electric generators. A 150-horse-power engine has also just been sold by this concern to the Kimberley Mines of South Africa. This engine will be directly connected to two 50-kilowatt generators of the double-end plan.

The Riter-Conley Company, of Pittsburg, have just shipped ten carloads of structural steel to Dublin, Ireland. A second shipment is to be made, and mechanics will be sent along to erect the power house for the Dublin Electric Tramway Company, for whose account the shipments are being made.

The New Britain Knitting Company has received a large order for underwear from Johannesburg, South Africa. The samples and quotations are said to have been in competition with English goods, and as a result the order was placed in this country. This is alleged to be the first record of any direct underwear business with the Transvaal.

The National Cash Register Company has shipped recently large numbers of cash registers to Berlin, Hamburg and Vienna. The foreign demand for cash registers increases constantly.

Twenty engines for New Zealand are being built by the Baldwin Locomotive Works. Heretofore New Zealand has placed its orders in England. The Baldwin works have also received an order for four engines from the Ottawa, Arnprior and Parry Sound, of Canada.

The unfortunate *Bourgogne* had aboard \$25,000 worth of agricultural implements exported from this country and intended to go to France. This was not a solitary instance, for we have been sending large quantities of manufactured goods to France. These consist largely of harvesting machines and other agricultural implements, which have been going out to France at the rate of about \$25,000 a week. This, of course, is not an immense quantity, but it shows a great improvement as compared with a few years ago. It is said that the shipments of bicycles range from \$15,000 to \$18,000 a week. There is also a good demand for milling machinery, small ice plants and other kinds of manufactured goods, including hardware.

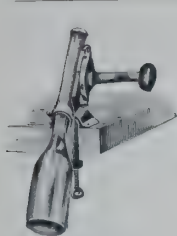
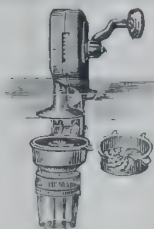
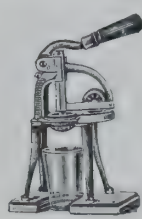
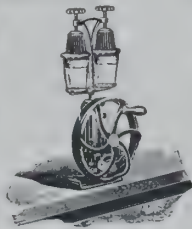
F. & J. Meyer, of 192 Front street, sent recently to Australia a large quantity of woodenware, including handles of all kinds, pails, tubs and spokes. The firm says that business with Australia is in excellent condition. This country makes most of the woodenware required by the world, and the reduction of freight rates to Australia by one-half, as a consequence of the establishment of the new steamship line, has given a great impetus to our export trade with that country. The export of woodenware to the West Indies, the firm says, is not so brisk as usual, due perhaps to the war.

The Pope Manufacturing Company, Hartford, Conn., reports that three days after the opening of the present French Motor Carriage Exposition it received by cable from Paris a cash order for eight of its Columbia motor carriages. It is said that this is the largest single sale yet recorded at the show.

An illustration of the wide range of applications of compressed air power is the following sales report. In all, nineteen air compressors were sold for operating pneumatic stone tools, chipping and calking tools, air hoists, etc.; nine air compressors for moving and elevating acid and chemical solutions; four air-lift pumping plants were installed and placed in operation; three air compressors were furnished to rubber works for removing hose from mandrels, testing hose and inflating tires; one compressor was supplied for the pneumatic transmission of messages; two for oil-burning plants; three for racking off beer in breweries; one for spraying brick in the process of manufacture.

**American Tacks in Australia.**—It was by superiority of putting up alone that the United States gained the market for tacks in Australia. For a long time the United States makers put their tacks in cardboard boxes, while the British put theirs in paper packages. The former style was and is preferred. Some British tacks are now put up in cardboard boxes, but the market has to be won again. The Americans are now putting tacks in extremely handy turned wooden barrels. It is very probable that tacks so put up will displace all others.



25. Quick and Easy  
Cork Puller.28. Samson  
Cork Puller.42. Quick and Easy  
Lemon Squeezer.45. Acme  
Lemon Squeezer.48½. Quick and Easy  
Shaker.34. Self-Pulling  
Cork Screw.39. Self-Pulling  
Cork Screw.Clock movement. Cuts at  
touch of cigar.59. Safety Automatic  
Cigar Cutter.Order through New York  
export houses.

54. Cigar Cutter.

**ERIE SPECIALTY COMPANY, Erie, Pa., U. S. A.****WHITING MFG. CO.,**South Framingham,  
Mass., U. S. A.

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NASHUA, N. H., U. S. A.

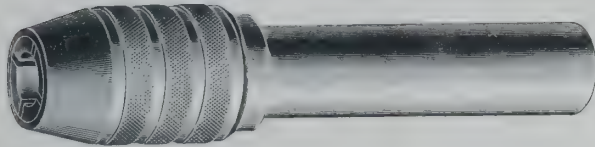
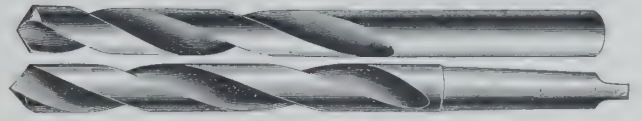
Harness Saddle Trees (in iron), Gig, Track,  
Coupe, Express. All styles and sizes.Harness Saddle Mountings, such as Terrets,  
Check Hooks, Etc., Etc. All Patterns.

Brass, Nickel and Imitation Rubber Finish

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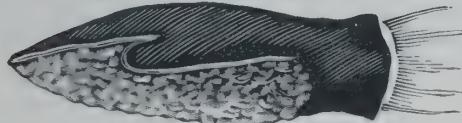
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Made in the World.**Also Chucks, Rose Reamers and Machinists' Tools.**

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**DIAMOND HARDWARE CO.****EVAN LEIGH & SON,**

19 James St., LIVERPOOL, England,

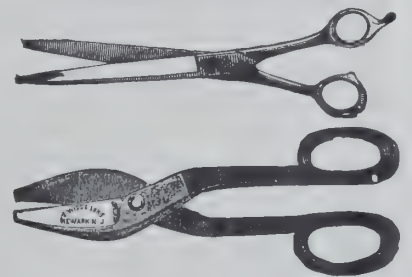
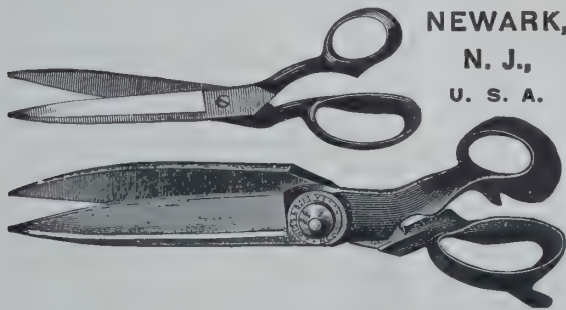
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SNIPS, PRUNING SHEARS, LADIES' SCISSORS,  
PAPER AND BANKERS' SHEARS, ETC., ETC.Send for Illustrated Catalogue "E," and when ordering through Commission  
Houses, kindly send us a duplicate of order.**For Car Curtains, Car Seats, Headlinings** there is no material equal to PANTASOTE.Better than leather and costs half as much. Does not crack, peel or rot. Is not affected by heat, cold or climate; water-proof, grease-proof, stain-proof and almost wear-proof. Contains no rubber or cellulose and is **NOT INFLAMMABLE**. Made in all standard colors, in plain leather grains or richly embossed designs.

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### New Catalogues.

*These catalogues may be had free of charge on application to the firms issuing them. Please mention THE AMERICAN EXPORTER when you write.*

THE MARYLAND STEEL COMPANY, Sparrow's Point, Maryland, U. S. A., has sent us a copy of the general catalogue of the Pennsylvania Steel Company, of which it is the export representative. It is a mammoth book of 375 pages. It contains over 250 pages of cross-section diagrams of the almost innumerable types of steel rails manufactured by this firm, together with a very elaborate series of illustrations of switches of various kinds. In addition it contains many half-tone illustrations of great railroad bridges and other structures built by this company, including the new steel railway arch bridge across the Niagara River, the main span of which is 550 feet in length and which carries two railroad tracks 225 feet above the rapids. The total length, including approaches, is 1,074 feet, and the weight of steel 7,200,000 pounds. The arch is the longest and heaviest in existence. The catalogue has excellent indexes and is invaluable to buyers of steel rails.

OLIVER BROTHERS, Lockport, N. Y., U. S. A. Large illustrated catalogue of brass and iron bedsteads, with price lists. Supplements printed in Spanish and Portuguese contain the price lists, while the illustrations in the catalogue, being colored in indication of which parts are brass and which iron, explain themselves and should enable a buyer to select intelligently and with ease. The line includes every variety and all possible grades and prices.

THE SMITH PREMIER TYPEWRITER COMPANY, Syracuse, N. Y., have sent us five catalogues for the United States, Great Britain, Germany, France and the Spanish-speaking countries respectively. All are handsomely illustrated and present clearly and briefly the distinctive features of the latest models of the Smith Premier Typewriter, besides describing a number of styles of typewriter desks and tables.

A. H. PATCH, Clarksville, Tenn., U. S. A. Descriptive circulars of Patch's "Black Hawk" corn sheller and separator, with illustrations showing each part separately for convenience in ordering repairs.

THE SAMUEL WINSLOW SKATE MANUFACTURING COMPANY, Worcester, Mass., U. S. A. Catalogue and price list of ice and roller skates and skate straps. Illustrated.

THE KEYSER MANUFACTURING COMPANY, Chattanooga, Tenn., U. S. A. Illustrated catalogue of the "Odorless" refrigerators, giving explicit and full explanation of the principles on which it bases its success. Numerous sizes and styles. A feature of this catalogue is the facsimile testimonials that it includes.

NORDYKE & MARMON Co., Indianapolis, Ind., U. S. A. Price list of flour-mill machinery and supplies. Some idea of the extent and scope of the line represented by this 188-page price list is indicated by the fact that the index alone fills eleven pages. Every machine and article used in a first-class flour mill is included in the list. A supplement contains a number of new specialties, including a number of new roller mills of various sizes, new automatic feeders, purifiers, dust collectors, etc.

THE ECO MAGNETO CLOCK COMPANY, 620 Atlantic avenue, Boston, Mass., U. S. A. Descriptive catalogue of watchmen's clocks. Illustrated and contains numerous testimonials, as well as much matter of interest to all users of watchmen's clocks.

GARDINER CAMPBELL & SONS, Oregon and Barclay streets, Milwaukee, Wis., U. S. A. Illustrated catalogue of bells for schools, churches, factories, etc., locomotives, ships and all other purposes. Describes also a number of chimes and peals, and includes explicit directions for mounting, attaching rope, etc.

ERIE SPECIALTY COMPANY, Erie, Pa., U. S. A., send us a catalogue and price list of their specialties, including cork pullers, pocket corkscrews, self-pulling corkscrews, lemon squeezers, shakers, ice grips and shaves, cigar and tobacco cutters, cigar lighters, etc., etc.

WITTE IRON WORKS COMPANY, Kansas City, Mo., U. S. A. Catalogue of gas and gasoline engines, including special marine engines. Gives description of special features and directions for ordering. This is only one of several catalogues issued by this firm.

THE LUNKENHEIMER COMPANY, of Cincinnati, Ohio, U. S. A., are issuing for the use of engineers a simple and practical chart giving diagrams of a new method of analyzing the movement of the slide valve. Every engineer should have one, as its use will enable him to thoroughly understand the re-

lation between the slide valve and crank movements without the aid of any intricate mathematical calculations whatever. Sent free upon request of any bona-fide engineer.

THE PREMIER MACHINE AND ENGRAVING WORKS, 164 William street, New York, N. Y., U. S. A. Catalogue of paging, numbering and indexing machines, designers', engravers' and bookbinders' tool cutters, dies for embossing, etc. Illustrated.

THE FRANK MILLER COMPANY, 349 West 26th street, New York, N. Y., U. S. A. Sixty-first annual price list and catalogue of harness and carriage dressing, axle oil, hoof dressing, sewing-machine oil and all kinds of boot and shoe dressing, polish and blacking. Index and table giving weight and measurement of packages ready for shipment.

THE PANTASOTE COMPANY, 29 Broadway, New York, U. S. A., have sent us one of the most original and dainty booklets that we have seen for some time. It is admirably illustrated in colors and describes in an interesting way many of the uses to which the substitute for leather called "Pantasote" can be put and how it surpasses leather for many of them.

THE DART MARKING MACHINE COMPANY, 235 State street, Hartford, Conn., U. S. A. Descriptive circular and price list of their marking machine which they call a practical typewriter for cases, boxes, barrels, parcels, etc., and for printing signs, bulletins and the like.

### New Publications.

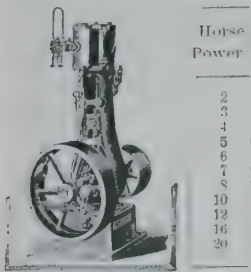
LIGHTING BY ACETYLENE, by William E. Gibbs, M.E. This is not intended as by any means the final word on the subject of which it treats, but rather as a practical handbook for business and professional men, presenting the present state of our knowledge of acetylene, and describing some of the more important of its applications. The book contains a very brief history of acetylene, a clear statement of the dangers attending its use and how they may easily be avoided. This is followed by an illustrated account of the generation of the gas. According to Mr. Gibbs, generators may be divided into three classes: 1st, those which have the generator and gasometer separate and in which the gas is produced by supplying water gradually and in measured quantity to a considerable portion of carbide contained in a closed vessel; 2d, those which contained both the carbide and water, with means for immersing and withdrawing the carbide successively; and 3d, generators provided with means for dropping measured quantities of carbide into a large volume of water. The author notes that thus far the American generators belong to the first two classes only. He gives in an appendix the United States patents on calcium carbide and acetylene apparatus. Published by D. Van Nostrand Company, New York.

USEFUL NOTES FOR TRAVELLERS IN EUROPE The eleventh edition of this handy little pocket guide contains, if possible, more useful information than its predecessors. Much of it is of the practical kind that the guides like Baedeker omit to give. Published by Pitt & Scott, 39 Broadway, New York.

### Blotting Paper for Cleaning Machinery.

FOR cleaning machinery and parts of engines which are soiled by lubricating materials and dust while in use, fibrous substances, such as tow, woollen refuse, sponge cloths, jute, waste, etc., are usually employed. The better varieties of cotton waste are sufficient for the clean scouring of parts of machines, but the cheaper ones are charged with dust, making the use of a sponge cloth necessary, which is especially manufactured for this purpose. Of late the use of blotting paper for scouring purposes has been recommended. Not only can the use of cotton waste be decreased, but also the sponge cloths become entirely superfluous. The workman formerly received on an average 250 grammes of cotton waste, one new sponge cloth and one or two washed ones per week; now he receives 150 grammes of cotton waste and eight to ten sheets of blotting paper. The former cost was 25 pfennigs ( $6\frac{1}{4}$  cents); now it is only 10 pfennigs ( $2\frac{1}{2}$  cents). Hence the paper goes much farther than sponge cloths and woollen refuse, and, as it cannot soil the machine with fibres and dust, it is decidedly preferable to cotton waste. Besides, the blotting paper is not so combustible as the other cleaning mediums. Another advantage of the paper over cotton waste is that in case it should get caught while cleaning parts of engines which are in motion, it tears easily and does not draw the hand of the workman into the works.—*Journal der Goldschmiedekunst.*





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HAS LARGE WEARING SURFACES,  
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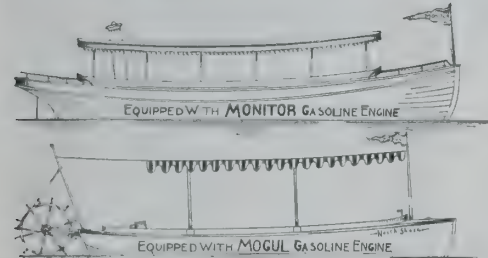
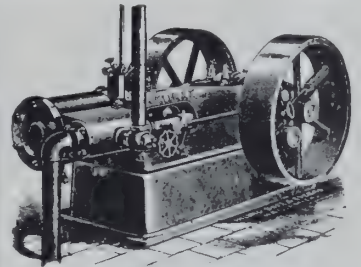
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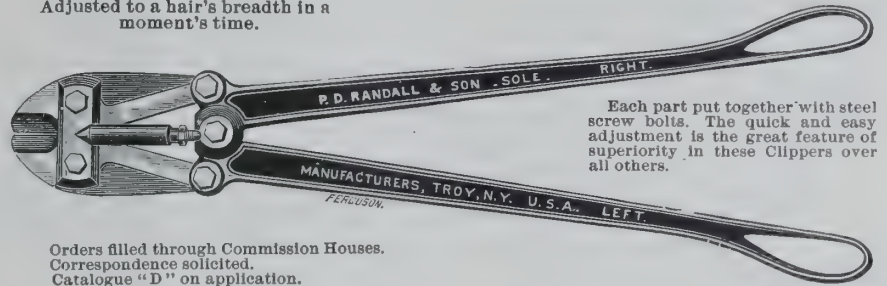
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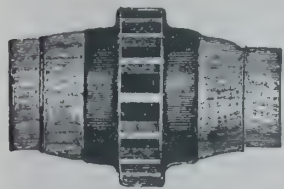
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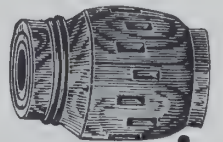
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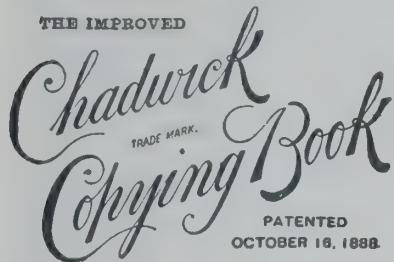
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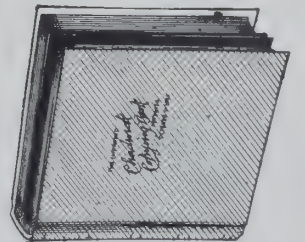
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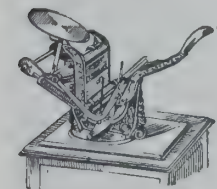
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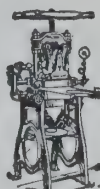


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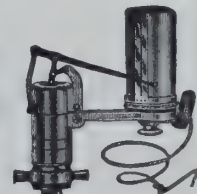
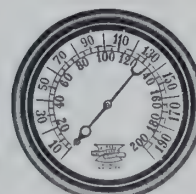
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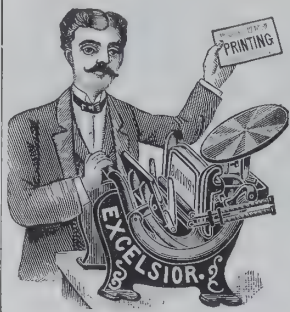
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Hand presses, easy to use by man or boy. Type-setting and good printing easy by full printed instructions sent.

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A rapid modern rotary press. Best in the world. Price, with 15 styles of type, all accessories for general printing, \$200. Chase 9x13 inches. Larger press, similar system, chase 11x17 inches, \$400, outfit included.

### CARD AND PAPER CUTTER.

Good hand machine with 24-inch steel knives, \$12.00.

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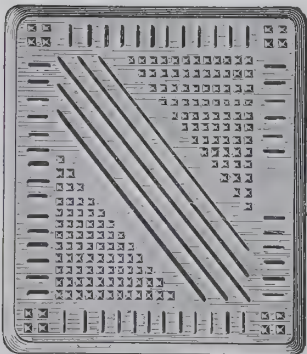
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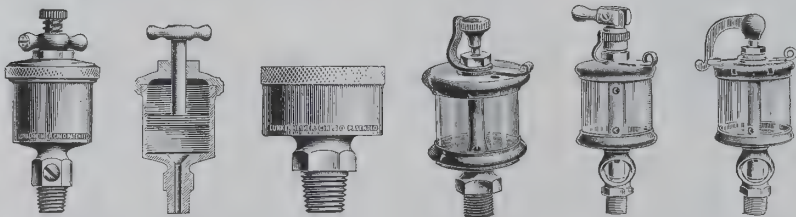
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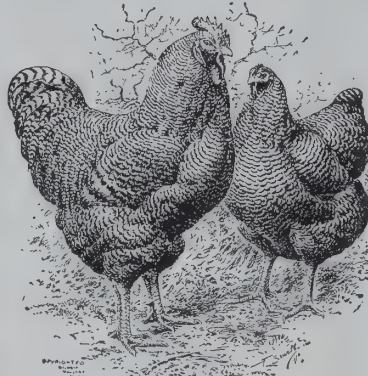
It makes no difference to us which, but if you want the best cups to feed it, specify

**"LUNKENHEIMER" MAKE.**

We have a big variety in PLAIN and AUTOMATIC patterns for every purpose. "LUNKENHEIMER" on any brass or iron specialty is a guarantee for SUPERIOR QUALITY, EFFICIENCY and DURABILITY. Write for Catalogue. Send your order direct or through Export Commission Houses.

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We raise FANCY POULTRY in all the Popular American Breeds, and have had a large experience in SHIPPING FOR EXPORT.

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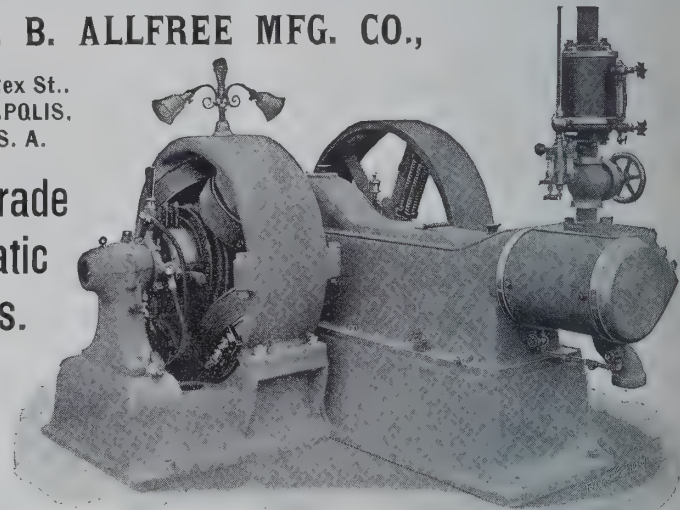
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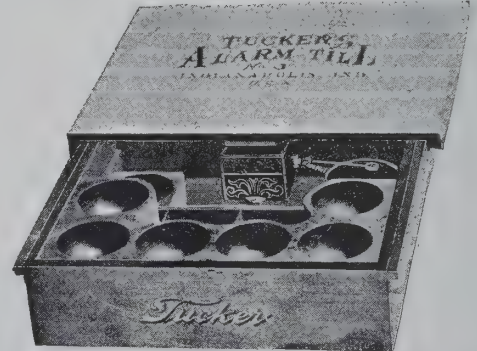
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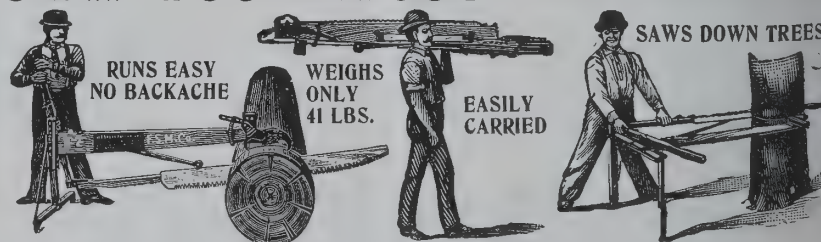
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It saws down trees. Folds complete as a pocket knife. Weighs only 41 lbs. One man can carry it on his shoulder easily. It saws any kind of timber on any kind of ground. It is instantly adjusted to the ground and log so that the log is always cut square in two. It makes no difference how rough the ground is, and the operator never has to bend his back. 9 CORDS have been sawed by one man in 10 HOURS. It is a great labor and money saver, as one man can saw more wood with it than two men can in any other way, and do the work a great deal easier. It is made in two sizes. No. 1 carries a saw 5 1/2 or 6 feet long and saws any tree under 3 feet in diameter. No. 2 carries a saw 5 1/2, 6, 6 1/2 or 7 feet long and saws any tree under 5 1/2 feet in diameter. Send for free illustrated catalogue showing latest improvements and complete description, and special prices in large lots. Net Price List, F. O. B. New York, Weights and Measurements.

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We manufacture machines for making  
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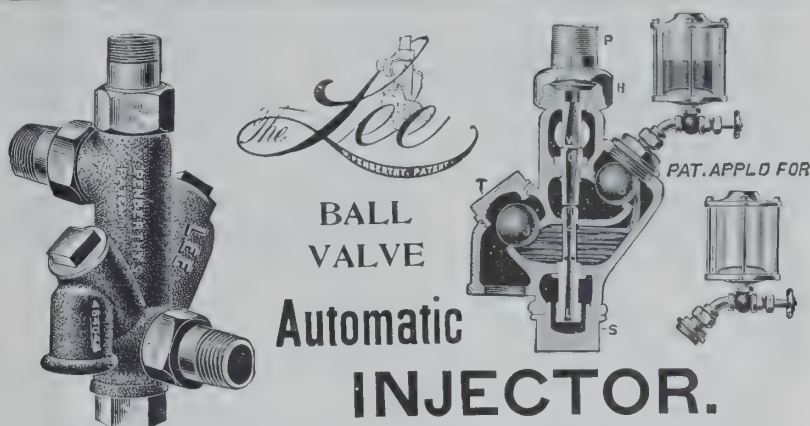
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**Marine  
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ARE THE

**LATEST IMPROVED, the  
NEATEST, SAFEST, EASIEST**  
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**BEST ROLLING LADDERS**

in every respect in the world.

To save delays, order at once with the follow-  
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to top of base shelf; Width of base shelf to  
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to top of shelf where track is to be fastened.

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The pieces of track are to be as near to as pos-  
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This is an extra fine Lamp, made in three sizes, has no chimney,  
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60 Laight Street, New York, U. S. A.

Established in 1840.



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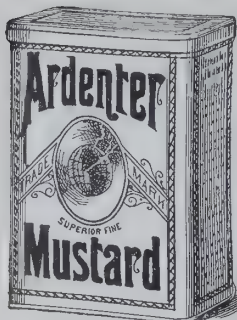


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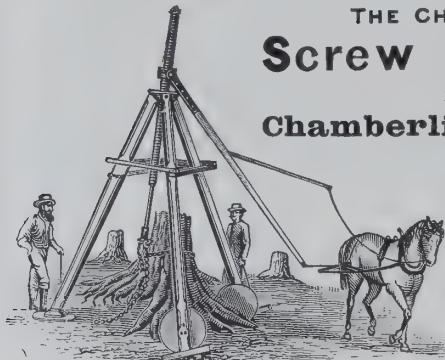
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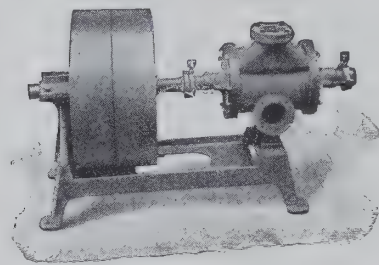
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Write for full particulars and prices.



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## Taber Rotary Pumps.

No. of Pump	Diameter of Suction and Discharge.	Gallons per Minute	Price
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2	3" x 3"	150-200	90
4	4" x 4"	200-350	125

SIMPLE. POWERFUL. DURABLE.

Do more work and cost less to operate than any other Pump made.

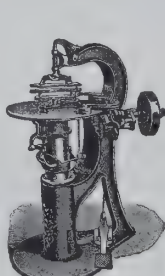
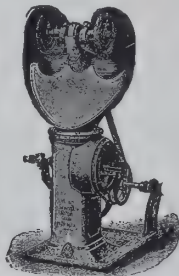
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Felt and Rubber Wheels  
of all kinds, etc., etc.

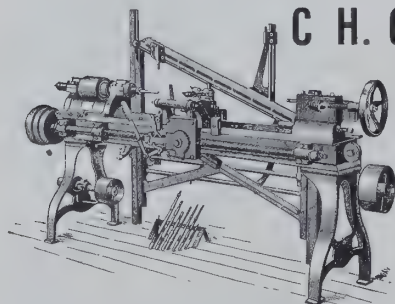
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affording delightful pastime for both old and young, showing 32 excellent views of historic places in both the old and new world. Also the exhilarating ride on horses and in chariots. Also a small machine for children's use on lawns. Send for catalogue. Orders filled through commission houses. Send duplicate of order to us.

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## Wood-Working Machinery Specialties.

CHAIR AND NOVELTY MACHINERY.

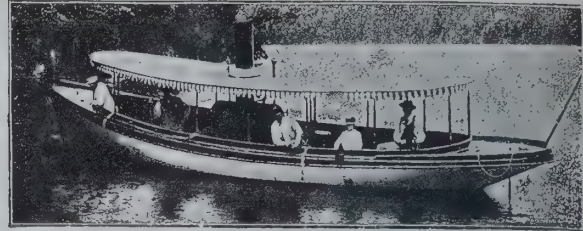
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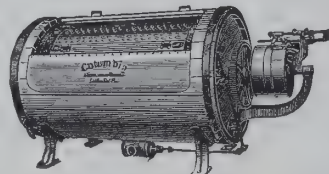
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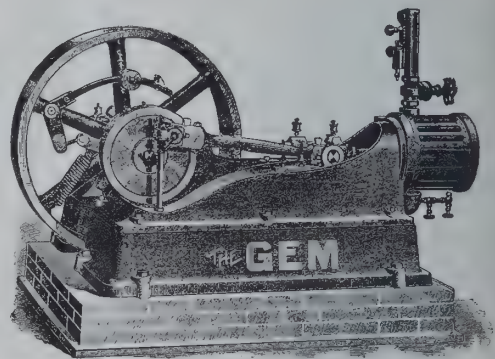


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WILSON LAUNDRY MACHINERY COMPANY,  
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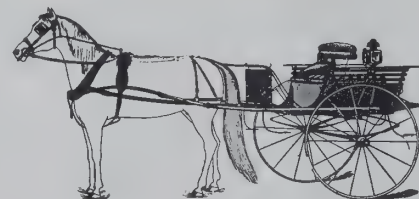
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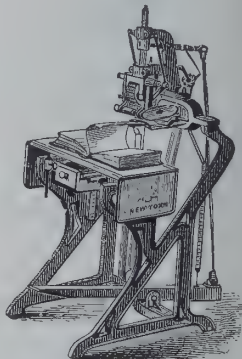
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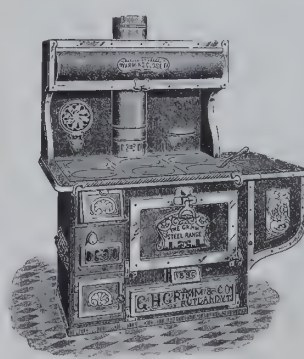
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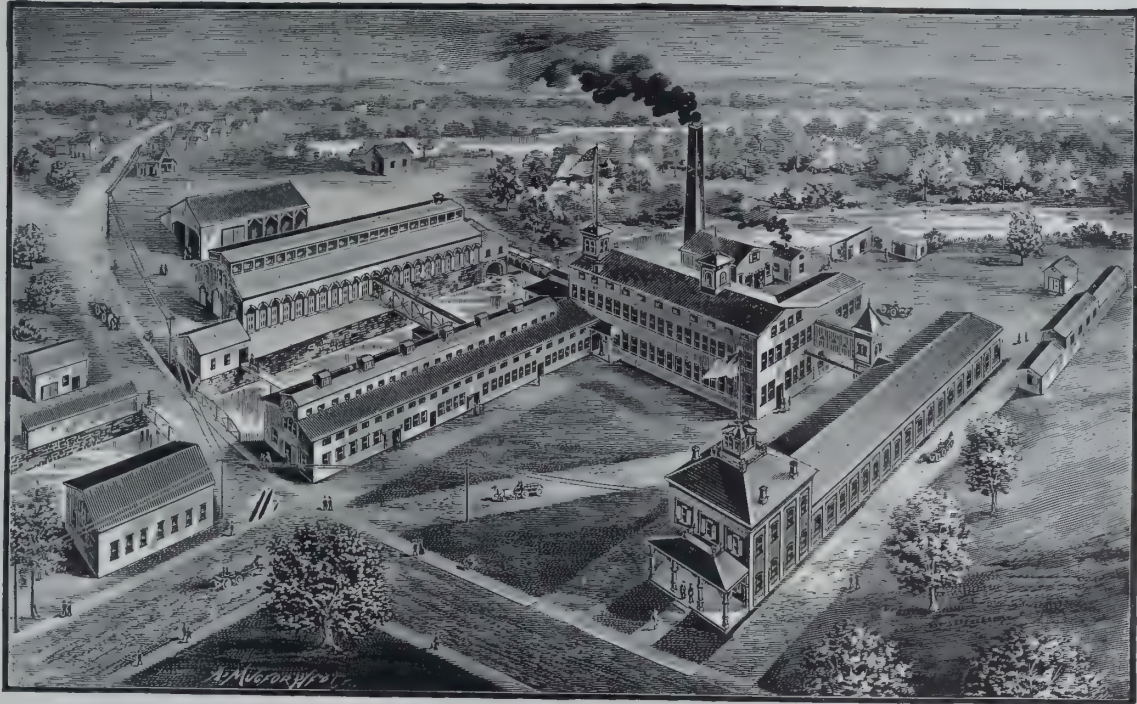


# THE H. D. SMITH & CO.

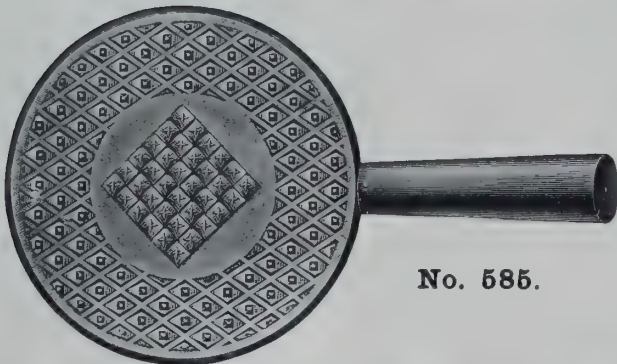
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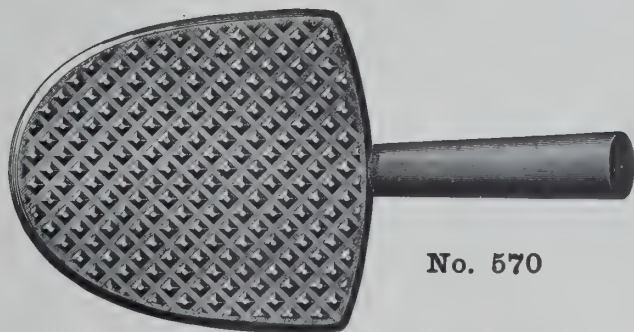
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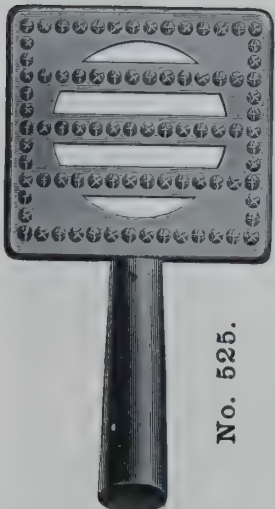
THE H. D. SMITH & CO WORKS, PLANTSVILLE, CONN., U. S. A.



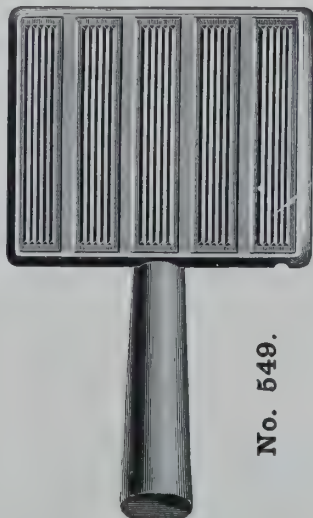
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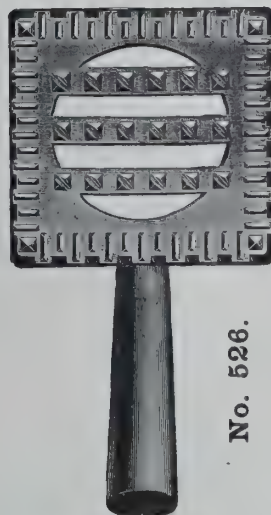
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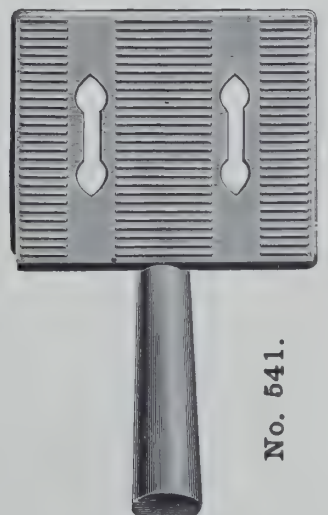
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WE MANUFACTURE 40 DIFFERENT PATTERNS OF STEP PADS.

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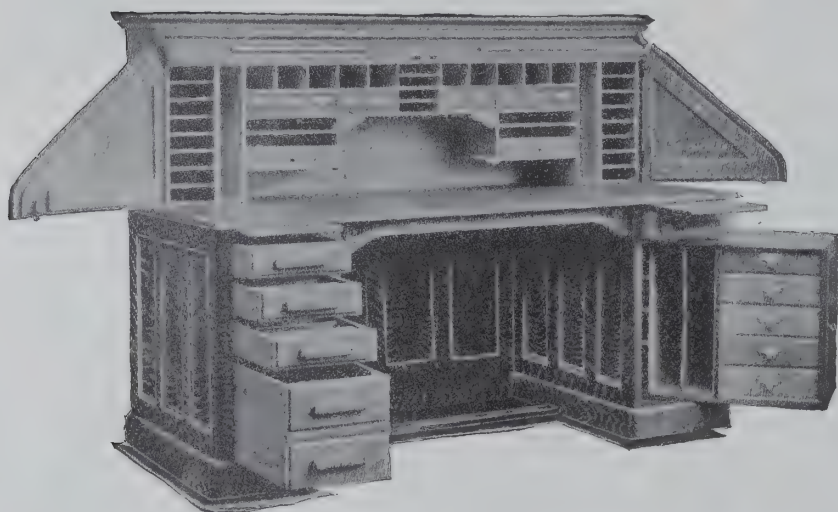


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# DESKS!!

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NO. P. 301, "A."

**\$45.00** buys this desk exactly as illustrated. It is 66 inches long, 33 inches wide, 51 inches high. It is made of the finest selected quarter sawed white oak, and has swinging side arms and FIVE COMPLETE LETTER FILES. 66 inches long, style "A," \$45.00. Style "B" or "C," \$41.00. 72 inches long, style "A," \$49.00. Style "B" or "C," \$45.00.



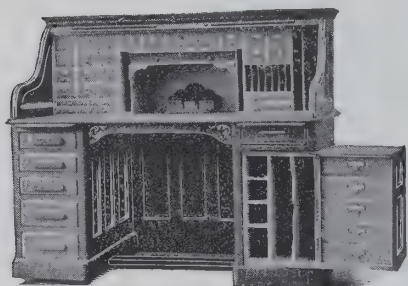
NO. P. 10 E.

**\$19.75** buys this desk exactly as illustrated. It is 48 inches long, 30 inches wide, 51 inches high. It has quarter-sawed oak front, closed back and THREE LETTER FILES in right pedestal under lock and key. This desk has been A GREAT SELLER.



NO. P. 243, ESTILO "B."

**\$17.00** buys this desk exactly as illustrated. It is made of quarter-sawed white oak and is supplied with LETTER FILES and large drawer in right pedestal. Size, 36 inches long, 28 inches wide, 44 inches high.



NO. P. 212, ESTILO "A."

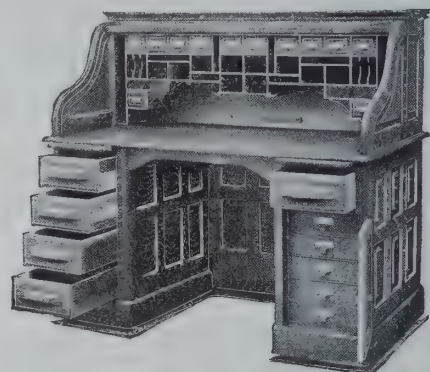
**\$43.50** buys this desk exactly as illustrated. It is 60 inches long, 33 inches wide, 52 inches high. It is an extra fine desk, made of quarter-sawed white oak and has FIVE COMPLETE LETTER FILES in the right swing pedestal.

60 inches long, style "A," \$43.50.  
Style "B" or "C," \$40.00



NO. P. 216, "C"

**\$11.60** buys this desk exactly as illustrated. It is 50 inches long, 30 inches wide, 31 inches high. It has closed back and is made of selected oak. Style "B" or "C," \$11.60.



NO. P. 241, ESTILO "A."

**\$35.00** buys this desk exactly as illustrated. It is 55 inches long, 32 inches wide, 51 inches high. It is made of the best figured quarter-sawed oak or cherry, and has FIVE COMPLETE LETTER FILES in right pedestal.

50 inches long, style "A," \$32.50. Style "B" or "C," \$27.50.  
55 inches long, style "A," \$35.00. Style "B" or "C," \$30.00.  
60 inches long, style "A," \$37.50. Style "B" or "C," \$32.50.

**NOTE.**—Style "A" has drawers in left pedestal and letter files in right pedestal as illustrated. Every person must have some place for letters, invoices, receipts, etc. Style "A" provides complete LETTER FILES within arm's reach, dust proof and under lock and key—a *very desirable feature*. Style "B" has drawers in both right and left pedestals. Style "C" has drawers in left pedestal and book cupboard in right pedestal.

## INFORMATION.

ALL PRICES given above include cost of boxing and delivery to New York City ready for export.

ALL DESKS are made of the best quality of white oak and are supplied in either light, medium or dark finish to suit purchaser, medium being supplied unless otherwise requested. All our desks are finished with best quality of piano polish finish.

ORDERS: We are well known to the leading export merchants of New York City, any of whom will be pleased to execute orders for our goods.

CONSTRUCTION AND PACKING: We have made a careful study of the needs of the export trade in this matter, and all desks are made with our "*sectional construction*," permitting them to be quickly taken apart and put together. This construction also permits snug packages, insuring both *safe delivery* and *lowest freight rates*.

# THE FRED MACEY Co.

Makers of Office and Library Furniture.

Grand Rapids, Mich., U. S. A.



TELEGRAMS: "WILSON, MIRFIELD."

# WILSON & INGHAM,

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Mild Steel and Plated Wire.



CARDING ENGINES CLOTHED, GROUND AND STARTED  
BY PRACTICAL MEN.



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BOSTON, MASS., U. S. A.

Oldest and Largest Manufacturers  
of Boot Polishes in the World.

Wholesale Manufacturers and Exporters of the following STANDARD BRANDS  
for BOOTS, SHOES and HARNESS:



## "GILT EDGE" OIL POLISH,

for ladies' and misses' shoes, is far superior to all others, as it blacks, polishes, softens and preserves the leather. Bottles hold about double the usual quantity. Price per gross, \$16.00; discount 10 per cent.

## "SUPERB" PATENT Leather Polishing Paste.

The only article that will produce a quick, brilliant and waterproof lustre without injury to the leather. The professional bootblacks of the United States use far more of this article than all other makes combined, because it



polishes quicker and easier, and requires less of it to do the work. Large size, per gross, \$8.50; discount 10 per cent. Small size, per gross, \$5.00; discount 10 per cent.

## "STAR" COMBINATION



package contains a 2-oz. bottle of russet leather cleaner and a small decorated tin box of russet leather polishing paste. The cleaner removes the dirt and stains, and the paste adds a brilliant, durable and waterproof polish. Price per gross, \$8.00; discount 10 per cent.

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For giving russet and yellow colored shoes a brilliant, durable and waterproof polish. Try it once and you will never be satisfied with any other polish. Per gross, large size decorated tin boxes, \$8.50; discount 10 per cent. Small size, \$5.00 per gross; discount 10 per cent.



**FRENCH GLOSS.** Warranted fully equal to the best \$9.00 black dressings in the market (and put up handsomer). With handsome three-color lithographed cartons and wood caps over corks. Price per gross, \$8.00; discount 10 per cent.

Also Manufacturers of POLISHES for Chocolate, Ox-Blood, Green, Brown, Blue and Purple Russia Calf, Vici Kid, "Willow" Calf, etc. "ELITE" Combination for Box-Calf, Black Vici Kid, etc.; also Dyes for converting light shades of leather into any of the above-mentioned colors.

All first-class articles that suit every one. If you are not suited and want the best, send us a trial order. Orders can be sent through any commission house in New York or Boston. Send for illustrated price list.

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# PHILADELPHIA NOVELTY M'F'G CO.

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## NOVELTY INKSTAND No. 3.

Novelty (Self-closing) Inkstand No. 3,

(SMALL),  
Retail, 35 cents.



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(LARGE),  
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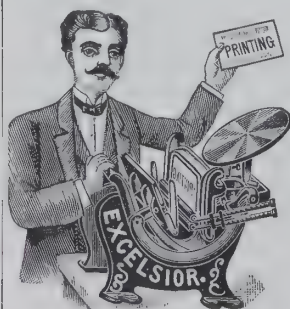
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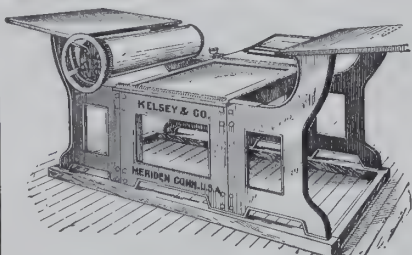
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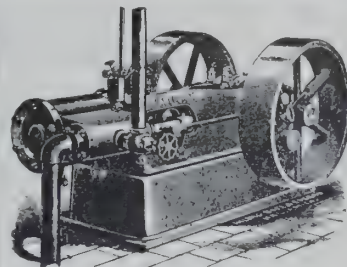


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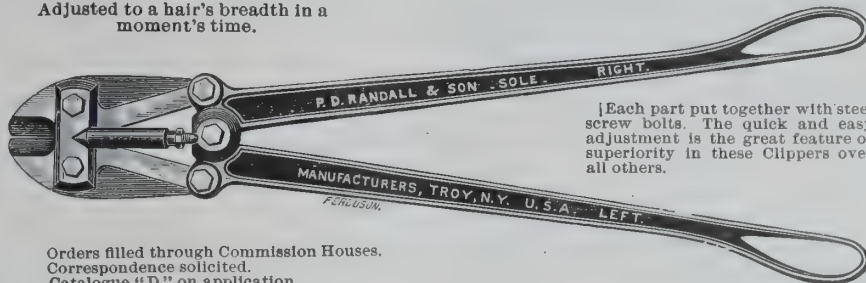
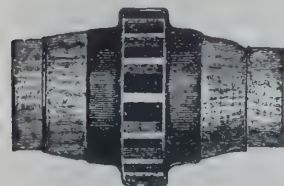
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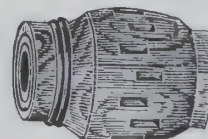
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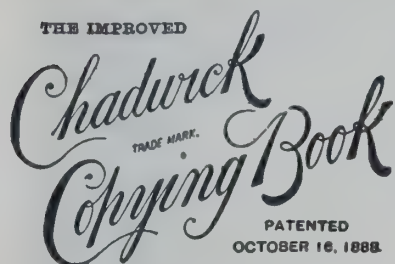
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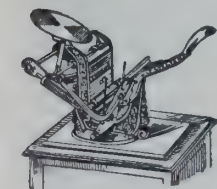
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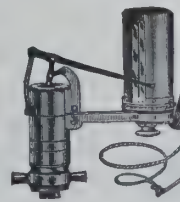
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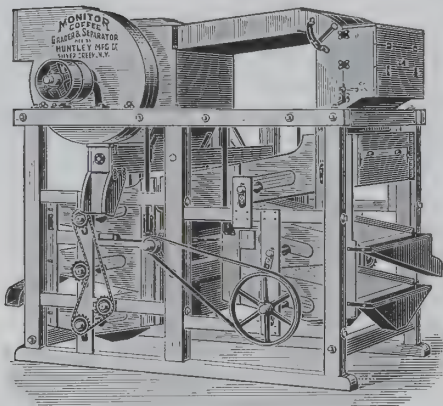


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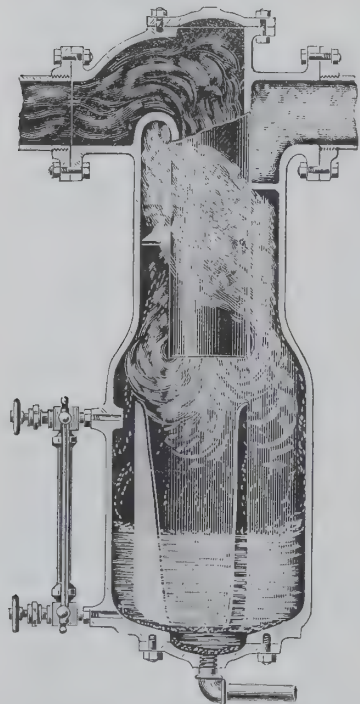
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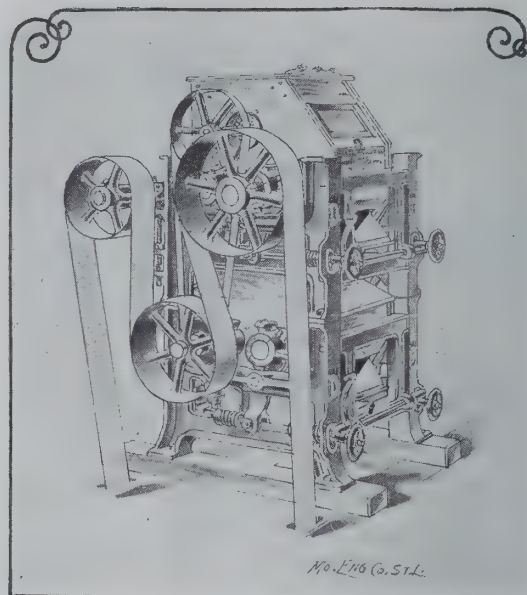
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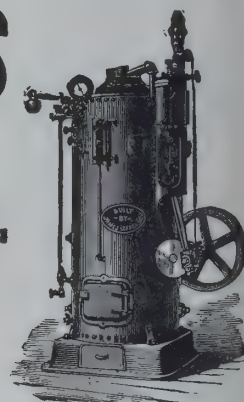
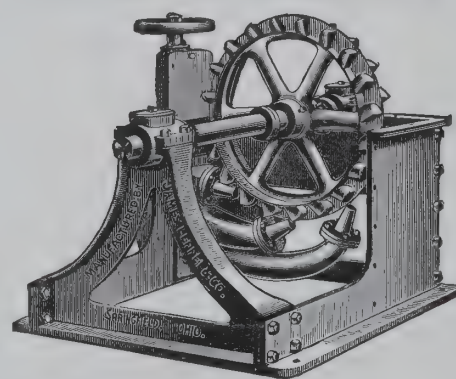
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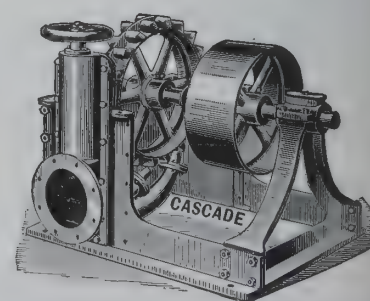
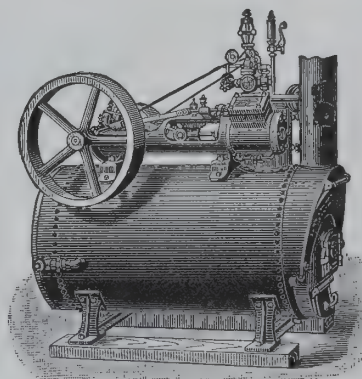
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# THE AMERICAN EXPORTER

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THE AMERICAN MAIL AND EXPORT JOURNAL

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THE AMERICAN EXPORTER does not publish reading notices recommending goods of any special make. To do this for one manufacturer and not for another producing wares equally meritorious would be manifestly unfair. We therefore recommend our readers to carefully examine its advertising pages, which are filled with the announcements of many of the best manufacturing concerns in their respective lines. What our advertisers say therein affords highly interesting, instructive and profitable reading, especially for merchants and importers who desire to obtain all that is latest and best in the line of manufactured goods.

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Inquiries concerning goods advertised in this paper should be addressed direct to the advertisers themselves, or, if readers prefer to order through their American buying agents, the name of the manufacturer of the desired article should be carefully specified. As a rule, orders should not be sent direct but to experienced and reliable export commission merchants for execution.

We shall be pleased to send to foreign buyers not having buying agents in New York the names and addresses of reputable concerns best qualified to serve them, provided that they state the nature of their business and the class of goods they are most likely to require.

## PEACE.

AS this issue of THE AMERICAN EXPORTER goes to press the preliminary negotiations between the Governments of Spain and the United States, through the medium of the French Ambassador at Washington, appear to be drawing to a successful close, and it is probable that before it reaches our readers peace between the two nations will be definitely in sight and all hostilities will be suspended. All who are interested in international trade must rejoice sincerely that this is the case. As the bonds of trade and of mutual interest and sympathy resulting therefrom grow stronger and more numerous, wars between civilized states become more and more a matter of universal concern, and a constantly increasing pressure, the like of which the statesmen of no other century ever knew, is exerted in behalf of peace.

It is not our purpose to discuss now or at any time the causes of the recent war. Suffice it to say that it was begun and carried to a brilliantly successful conclusion with the American people a unit in its support. And now that it is over, not the least of the satisfactory emotions that arise from a review of this four months' war—one of the shortest wars in history—is the fact that on both sides the casualties were relatively so slight. The two decisive battles of the war, the sea fights at Manila and Santiago, were won with the loss of a single life on the American fleets, and even the defeated, owing to the prompt succor of their former foes when the fighting was over, lost fewer than might have been anticipated in view of the utter destruction of their ships. The fighting on land around Santiago, which at first promised to be unusually sanguinary, ended with honor to both combatants without repeating such scenes of slaughter as became fearfully familiar in the great Civil War of 1861-65 and the Franco-Prussian struggle of 1871.

One other feature of the war has been so notable that we feel that the attention of all interested in international

trade should be called to it. That is the utter absence of any attempt on the part of either combatant to derange the great seagoing commerce of the world. The United States, in view of the fact that its vessels were maintaining a blockade of many hundreds of miles of seacoast, inevitably was compelled to make a considerable number of captures. Spain, so far as we have learned, did not make one, nor did this country attempt to interfere with Spanish commerce apart from its blockades. The rights of neutrals were scrupulously respected by both parties. The privateers, of which much was heard at one time, never materialized. American export trade, so far from vanishing, increased; nor did the export trade of Spain, aside from that with her former colonies, suffer materially. All this is highly satisfactory as furnishing some guarantee that in the future, should war between civilized states again arise, commerce will not even be subjected to the detrimental influences of a "scare."

The return of peace finds the whole world in a better position than ever before to advance to the solution of the great industrial problems everywhere confronting it. There are railways to be built, cable and telegraph lines to be laid, whole empires of unreclaimed or but semi-developed regions to be brought into fullest service for the human race. Petty jealousies should not be permitted to retard this work of progress and development. We believe that the world is on the brink of the greatest period of material prosperity in its history. Here in the United States business was never on a sounder footing or better able to meet such large demands as seem to be impending. Our most cordial wishes go out that prosperity in equal or in greater measure may be with our friends in the British Empire, in Russia, France and Spain and throughout the world. May it be upward all together!

## ONE RESULT OF THE WAR.

ONE of the most important consequences of a war is the effect it produces upon public opinion regarding the combatants. Not only does each side in a modern conflict between civilized States come to know the other better and appreciate more fully than before the bravery, fortitude and patriotism of its opponent, but the two antagonists are thrown into such a glare of publicity that the whole world is enabled, sometimes even compelled, to revise its long-established opinions and acquire juster estimates of one or both.

Such will inevitably be one of the outcomes of the recent conflict. In time past there has been no great nation regarding which the rest of the world acquired so little information, or rather regarding which it acquired so much information that was untrue. Europe in particular appears almost to have taken pains to misinform itself regarding the United States. European editors, a few through prejudice possibly, but most through ignorance, have supplied their readers with the most astonishing "news" regarding Americans and things American. According to these scribes we Americans belong mostly to three great classes—farmers, cowboys and gold diggers—and spend our leisure in pistol practice with our friends or in lynching our enemies. It is less than five years since European newspapers of the better class, under the lead of the great London dailies, have begun to give their readers really intelligent accounts of affairs on this side of the Atlantic.

The war will greatly accelerate this desirable change. Such absurd statements regarding American people and civilization as were not long ago habitually made by French, German and other continental editors will no longer be believed by any one, and will cease to be made. Americans



will not be the only gainers from this. For business men, and particularly manufacturers and importers, to judge of the United States by such items of information as formerly filtered through the press in their locality would often result only in their own injury. Others will be well informed if they are not. People are learning in a hundred ways how great and civilized a country the United States really is. Users of machinery are alive to the fact that American invention must be taken into account in equipping their factories. Users of manufactured articles of a thousand types are interested in the products of American mills. The war cannot fail to stimulate this interest and alertness. It has been a demonstration of the qualities of certain American products that has secured recognition in every hamlet where any glimmer of what is going on in the great modern world penetrates. Wide-awake buyers are sure to profit by turning this increased interest and confidence in American goods to their advantage by taking steps to be able to supply the demand that is already setting with greater volume than ever before in this direction.

### THE VALUE OF PERMANENCE.

A VERY good story was told in one of our exchanges recently about a firm of tailors named, for the purposes of the story, Smith & Brown. The firm had a store situated in the heart of the best business district of New York, and was liberally patronized by the "chappies" who frequented that part of the city. The proprietor, Smith, was admirably made up for success in such a business. To the manners of a Chesterfield he united an air of graceful condescension, causing a customer to feel that he had been highly honored in being admitted to the inner circle allowed to purchase their clothing of this distinguished house. The cutter of the establishment, here called Brown, was as well fitted for his work as Smith was for his. In elegance of fit and finish his products quite justified the reputation of the establishment and the handsome prices it charged.

After some years the associates quarrelled and Brown set up a rival establishment of his own. Smith hired a new cutter, several, in fact, one after another, but trade steadily drifted to Brown, until in the end Smith had to close his doors. One day Brown was questioned as to the reasons for Smith's collapse when he had apparently all the elements of success in getting trade. "Oh, bless you, yes," said Brown, "a man like Smith can get trade easily enough, but only a tailor can keep it."

This epigrammatic remark contains a large truth that is not limited in its application to the clothing or to any trade. In the modern scramble for *getting* business many are apt to forget that of even greater importance are the qualities essential to *keeping* business. Any glib-tongued and unscrupulous fellow can persuade some people to buy his wares or to try his scheme, but only the genuinely honest and reliable, whose goods are what they are represented to be and whose promises are fulfilled, succeed in keeping their clients year after year.

It is the half unconscious recognition of the fact that permanence, age, stability represent in themselves a very high degree of probability that the goods offered by houses so continuing in business are reliable that gives such an importance to the fact that a house has stood for a considerable number of years. The world sees in this fact a certain measurable guarantee that the houses so continuing are worthy of patronage and their goods deserving of confidence. It is for this reason that firms that have existed since the last century, or for a generation, justly call public attention to

the fact. A beginner can offer promises, the long-established houses can point to performances. This was doubtless the reason why the great merchant prince, A. T. Stewart, insisted on never taking down a sign once it was up, and why his successor, John Wanamaker, invariably adds in all his advertisements, beneath his own name, "formerly A. T. Stewart & Co."

In this connection we wish to call attention to the fact that an unusually large proportion of the advertisers in this paper have "had their signs up" continuously for many years. Incidentally this means that they have found THE AMERICAN EXPORTER a good advertising medium, one whose results fully justify the promises of its publishers. But what we wish particularly to call our readers' attention to is the indication that it affords that the great American firms whose advertisements they read in these pages year after year are reliable and possess in a high degree, both personally and in the merit of their goods, those qualities of excellence that permanence implies. As President Lincoln said, "You can fool all the people some of the time, and some of the people all the time, but you can't fool all the people all the time." These manufacturers could not go on year after year engaging in export trade unless their goods were giving satisfaction and their business methods were sound.

We should very much like at this point to print the list of our advertisers who have been with us for periods exceeding, say, five years, but as such a list would, we find, contain over 125 names, we must refrain. We may remark, however, that many of these have "kept their signs up" continuously for periods greatly exceeding five years. A large number have been in ten, not a few fifteen, seventeen and twenty, and we are proud to be able to say that some have been with us continuously for twenty-one complete years, or since the founding of the paper. We believe that no higher testimonial to their reliability, and no more conclusive proof of the satisfaction given by their goods, could possibly be adduced than this.

### "YANKEE NOTIONS."

IN the early days of American development, when people still talked about "the great American desert" just beyond the Mississippi, and Illinois and Indiana were known as the "far West," itinerant vendors of small wares used to set out from the small industrial towns of Connecticut and Rhode Island and plod from farm to farm and town to town along the primitive trails and occasional wagon roads of the period. The stock in trade of these merchants was a curious one and altogether typical of the country at that stage of its progress. It contained flints and candles, knitting needles and articles for the spinning wheel—those were the days when everybody dressed in homespun—bits of finery for feminine apparel also, and spices. These goods for the ladies—for the men there was an equally miscellaneous assortment, including hammers, nails, axes, saws and the numerous other articles needed in frontier life. With these there were not a few of the little contrivances that American ingenuity had already devised for saving labor here and there.

It was to these last that the term "Yankee notions" came first and properly to be applied, but in many localities the whole assortment was so styled. As regards manufacture this was fairly correct, for nearly every article other than spices had its origin in New England. But as regards invention it was unjust to the parent country across the sea, where most of the staple articles had been in process of development and improvement for centuries. However, the term stuck and spread, not only all over the United States,



advancing as the boundaries of the Republic expanded, but beyond its borders into Canada and Mexico and more recently across the seas, until now it has been adopted bodily, without translation, in half a hundred languages.

Exactly what the phrase means to those who use it in each country of its adoption it is impossible to say. As far as the experience of the writer goes the better classes in France and Belgium use the term as nearly synonymous with *nouveautés Américains* and as descriptive or suggestive of almost any small invention whether labor-saving or not. He recalls instances when it was applied to a combination of manicure set and glove fastener or button hook, to the American type of hooded stereoscope—the French invented a box form long ago—to fountain pens, to the typewriter, and to perhaps a score of similar articles, some of which he must confess were of anything but American origin. In general, however, smallness of size and ingenuity of principle seem to be the essential characteristics to the European conception of a “Yankee notion.” These, of course, coupled ordinarily with the fact that the articles in question are of American origin. Throughout Great Britain the same idea appeared to prevail. No one, for example, thought of Wagner parlor cars, or of threshing machines, or electric trolley cars as “Yankee notions,” though all were universally conceded to be of American invention.

Still, it is clear that the phrase as now used is too wide to be very practical, and it is for this reason that we have undertaken to discuss it in THE AMERICAN EXPORTER. Hardly a day passes that we do not receive a request from somebody to forward to him catalogues from manufacturers of “Yankee notions.” In some cases we can judge from the letterhead of the applicant the probable class of articles that he desires. In others we are compelled to write asking for further particulars—a considerable delay. Accordingly, we would advise all who are interested in the broad class of small articles comprised under this heading to state as specifically as possible what they desire, whether in writing us or the manufacturer. Sub-classes will readily suggest themselves, such as advertising novelties, ironmongers’ and machinists’ articles—of which there is a long list of highly useful and ingenious devices coming properly under this title—jewellers’ novelties, and so on.

#### THE METRIC SYSTEM.

IN a few months will occur the hundredth anniversary of the date on which a committee of scientific men placed before the French Government the metre and the kilogramme as standards of weights and measures. We understand that preparations are being made in Europe for the celebration of this event as one of the most important scientific achievements of the century. If this is the case then certainly those who are interested in international commerce should join with the scientists, for the metric system has proved of even greater importance in commerce than it has in science. By 1840 this system had been declared obligatory in France, Belgium and Holland, and by 1877 it had been established in every country of Europe except Russia and Great Britain, in most of the South American countries and in India and Japan. In 1866 it was declared legal in the United States, the terms of the statute being permissive, however, instead of mandatory; and in the last session of Parliament an act (60 and 61 Victoria, chapter 46) was passed legalizing the weights and measures of the metric system in Great Britain. Thus, to use the picturesque phrase of *Mouvement Géographique*, “In a hundred years the metric system has conquered the world.”

The passage of a bill now pending in the Congress of the United States will render this “conquest” still more complete as far as this country is concerned. The bill, as favorably reported by the House Committee on Coinage, Weights and Measures, reads as follows:

*Be it enacted, etc.,* That from and after the first day of July, nineteen hundred, all the departments of the Government of the United States in the transaction of all business requiring the use of weight and measurement, except in completing the survey of public lands, shall employ and use only the weights and measures of the metric system, and from said first day of July, nineteen hundred, the metric system of weights and measures shall be the legal standard of weights and measures recognized in the United States.

This, as can readily be seen, is a great step in advance from the present status of the metric system in this country and should be hailed with satisfaction by all correspondents in lands where the metric system is already in use.

One natural result of the enactment of this law will be that the metric system will be employed on all gauges, scales, etc., manufactured in the United States. At present it is not uncommon for manufacturers of such articles as scales to have the American marks on one side of the scale beams, rules, etc., and the metric marks on the reverse side. The manufacturers of delicate instruments of precision usually employ the metric system also. In the case of articles designed and manufactured expressly for export, American manufacturers have usually conformed to the standards of weights and measures in vogue in the countries of their destination, and this practice will only be facilitated as the metric system extends into more universal use.

That the passage of an act of Congress will at a blow displace the systems of weights and measures that have been in everyday use in this country since its earliest settlement and substitute the ingenious but artificial French system is, however, out of the question. Whatever concerns itself so intimately with the daily life of the people is not so easily changed. It will very likely take another century for the conquest of the metric system to become so complete that all the world will *think* in metric measures. At present even in France, where the system has been compulsory for nearly a century, people still employ *pouce, pied, livre* and many other terms of ancient origin, while in Western Belgium and many parts of France the *lieue* is still unconquered by the kilometre. American schoolboys have learned the tables of metric units for nearly a generation, but most of us, who are not chemists, electricians or engineers, still do our measuring by the foot, pound and quart, and will continue to do so whatever the laws may say.

But while we may be thus somewhat skeptical as to whether the metric system, even if supported by compulsory laws, is likely at once to become established in the domestic life and trade of this country, there is less reason to suppose that it will not at once stamp itself upon that part of our community that is engaged in foreign trade. Here self-interest will come to the support of the law, and it is not only highly probable but quite certain that from and after the first day of July, 1900—should the pending bill become a law—all the confusion and inconvenience arising from dealing with two distinct sets of measures in the foreign commerce of the United States will immediately cease. The mere fact that the Government adopts the metric system in all of its departments will alone insure this, since that action will reduce all transactions, both import and export, to a metric basis for Government inspection, appraisement and enumeration.

The adoption of the metric system by the United States will be welcomed by both manufacturers and buyers and will greatly facilitate both our export and our import trade.



## THE GREATEST EXPORT YEAR IN AMERICAN HISTORY.

THE export commerce of the United States has again surpassed all records, the shipments of domestic merchandise abroad during the twelve months ending June 30th, which constitute the fiscal year in the bookkeeping of the Government of the United States, having been over \$178,000,000 in excess of the total for 1897, which held the record up to that time. While this phenomenal showing is unquestionably due to the enormous shipments of breadstuffs and other agricultural products, owing to the fortuitous circumstance that crops in the United States were exceptionally bountiful last year while over nearly all the rest of the world they were poor, it is worthy of note that the exports of manufactures not only held their own, but increased some eleven and a half millions over the record established a year ago. The following table clearly indicates the sources, in the most general way, of this immense volume of merchandise :

DOMESTIC EXPORTS.	1897.	1898.
Products of—Agriculture.....	\$683,471,139	\$854,627,929
Manufactures .....	277,285,391	288,871,449
Mining.....	20,804,573	19,802,417
Forest .....	40,589,321	37,900,171
Fisheries.....	6,477,951	5,538,925
Miscellaneous.....	3,479,228	3,551,206
Total.....	\$1,032,007,603	\$1,210,292,097

In the foregoing and in subsequent statistics no account is taken of the exports of merchandise of foreign origin. The reports of the Treasury Department show that such exports amounted during the fiscal year just closed to \$21,037,853, as against \$18,985,953 for the year preceding, or an increase of over \$2,000,000. But our chief interest and that of our readers is in the domestic exports, so with this word of explanation we dismiss the subject of foreign exports entirely.

Turning to a detailed consideration of the facts regarding the vast volume of trade represented in the foregoing figures, we find that notable, and, in some instances, almost sensational increases have taken place all along the line. Under agricultural implements the sale of American mowers and reapers abroad has increased from \$3,127,415 in 1897 to \$5,500,665; that of plows and cultivators from \$590,779 to \$927,250, while the total sales of agricultural implements, machinery and parts show an advance from \$5,240,686 to \$7,609,732, or more than \$2,000,000 in excess of the highest figures ever before attained by this branch of our exports.

Passing a little farther down the list of exports, which are arranged alphabetically, we note another very remarkable increase in the case of blacking. During the fiscal year ending June 30, 1897, our exports of this article (which comprises both shoe and stove polish) amounted to \$384,937. Ten years earlier the exports of this description amounted to \$195,197, and in 1877 to only \$101,886. Thus, there was an increase of no less than 278 per cent. in the two decades ending 1897. Last year, however, even this remarkable record was eclipsed and the total exports of this description jumped to the surprising total of \$733,568, or an increase of almost 100 per cent. in a single year. No better testimony as to the satisfaction given abroad by this class of American manufactures could be found than this.

Of passenger and freight cars for steam and other railways we exported last year \$1,738,581 as against \$990,950 the year before, an immense advance. Of this great sum \$1,478,188 was for cars for steam railways, and the bulk of the balance, \$260,393, was presumably for electric. No com-

parison on this point with previous years is possible, since the tables were never before issued separately. The exports of carriages other than bicycles fell off somewhat from those of last year, but attained none the less the very respectable total of \$1,685,838. Outside of Great Britain, where the Hooley failure, together with a number of other local circumstances has somewhat demoralized the trade, our exports of bicycles a little more than held their own. When it is remembered that the record figures of last year, \$7,005,323, represented an increase of no less than 269 per cent. over the preceding year, and that the preceding year, in turn, was the first when those exports were of sufficient volume to warrant being separately classified, it will be seen that in simply holding their own our bicycle manufacturers are doing well. They took the foreign markets by storm, so to speak. Now they are maintaining what they have won. The decline in our exports to Great Britain amounted to about \$500,000. The total amount exported throughout the world was \$6,846,529, or about \$150,000 less than in 1897. This indicates that, outside of Great Britain, American bicycles are still gaining.

Of typewriting machines the official returns said nothing prior to last year. During that year the exports amounted to \$1,453,117. During the year just closed they increased still further to the vast sum of \$1,902,153.

A similar exhibit is made all along the line. For the present, however, it is not so much our purpose to discuss exhaustively the details of this great expansion in American export trade as to indicate, by an illustration here and there, its general scope and extent. Unquestionably the showing made by our exports during the fiscal year ending June 30, 1898, is one that should be satisfactory to American manufacturers. If the steady increase in the exports of every variety of manufactures means anything, it is clear that the goods represented in this showing have proved and are still proving satisfactory to the foreign buyers and users, hence we may fairly add that the showing above indicated should be satisfactory to the foreign buyers also.

### AMERICAN BICYCLE TIRES.

OUR attention has been called once or twice to complaints by European buyers that certain American-made tires have proven unsatisfactory. As far as we have been able to verify these complaints it appears that the buyers purchased their tires of irresponsible concerns having no regard for their own future or the reputation either of themselves or of American manufacturers generally. That there are such in every country and in every branch of trade is, we suppose, indisputable. But the remedy is so easy and so entirely in the hands of the buyer that there should be little difficulty in avoiding the traps set by these sharpers. All that any buyer, whether of tires or of bicycles, need do is to ascertain the standing of the concern with which he proposes to do business. We have, not infrequently, furnished such information ourselves and are always ready to do so on request, and there are plenty of other reliable sources of information.

If the trouble is due to substitution on the part of the commission house, such a house should be punished by the transfer of the entire buying account of the victim to a more honest house. We believe that there are few commission houses who would be guilty of this, and certainly no reputable and honorable house would do so. It is only fair to say, however, that buyers who insist on having goods billed to them at absurdly low prices have only themselves to blame if the goods prove worthless. Two-dollar tires—retail price—are as impossible as ten-dollar bicycles, and buyers can hardly



expect that stock consigned to them at such absurd prices will differ materially from Hodge's razors which were made "to sell." Such goods are no more "representative" of American manufactures in this line than are the stocks of the cheap auction fakirs who frequent seaside resorts in England representative of the manufactures of Sheffield.

AS this issue of THE AMERICAN EXPORTER goes to press the preliminary figures regarding the foreign trade of the United States for the month of July have just come to hand. After showing that our exports for the month of July, 1898, surpassed those for the same month last year the Bureau of Statistics presents some very interesting tables, for those who care to compare figures, showing the exports, both domestic and foreign, by months for a period of six years. These tables follow:

MONTHS.	EXPORTS.					
	1892.	1893.	1894.	1895.	1896.	1897.
August .....	\$64,846,905	\$73,683,731	\$60,776,147	\$55,980,619	\$68,601,006	\$80,825,050
September .....	62,908,483	72,026,798	58,798,675	58,540,063	85,131,098	104,540,912
October .....	87,860,919	87,675,481	83,653,121	87,090,972	113,516,586	111,744,517
November .....	97,703,824	91,659,698	79,954,005	87,312,581	109,072,839	116,672,325
December .....	87,545,818	93,551,729	84,876,846	92,529,117	117,185,926	125,059,723
January .....	1893.	1894.	1895.	1896.	1897.	1898.
February .....	67,673,669	85,940,226	81,229,964	86,970,028	93,951,883	108,426,672
March .....	59,931,984	95,175,331	55,982,733	77,701,904	79,821,096	94,917,453
April .....	66,516,571	70,640,839	65,161,847	75,574,184	87,282,247	112,620,496
May .....	59,873,346	64,124,812	65,255,641	71,091,747	77,648,786	99,314,816
June .....	68,955,348	61,043,583	64,267,179	66,568,263	77,871,276	111,283,435
July .....	65,446,569	57,504,487	54,967,830	66,705,871	73,192,034	94,978,909
Totals.... { 12 months ending July .....	\$858,377,293	\$875,640,891	\$811,465,579	\$893,783,138	\$1,054,379,735	\$1,232,871,161
{ 7 months ending July .....	457,511,344	457,043,454	443,406,784	512,326,786	560,872,280	694,028,634

From these figures it appears that in only one instance during the past twelve months have the totals for the month failed to surpass all previous records. The solitary exception, October, 1897, which was beaten by October, 1896, may not prove to be of importance in this connection, since October, 1898, has yet to be heard from. While the mere fact that each month has beaten the record in this way is in itself of little importance, the general indication that these figures convey of the steadiness of the growth of our export trade—and incidentally the absence of any decline on account of the war—is both important and encouraging.

THE report that Russia has finally adopted the policy of admitting free of duty, or under a greatly reduced tariff, the considerable variety of agricultural implements comprised in the imperial decree, a detailed reference to which appears on the first page of our agricultural department, will be good news not only to the manufacturers of such implements and machinery, but to all the sincere friends of Russia as well. It is the best possible indication that the rulers of that great Empire do not intend that their farmers shall be handicapped in any way by being forced to use antiquated or costly tools in their competition with the agriculturists of other lands. To-day, as never before, competition in agriculture is world-wide and those who persist in using appliances that are less than the best voluntarily place themselves out of the race.

The same problem faced the agriculturists in Russia that faced the agrarians of Germany and Austria. The difference in the manner in which it has been met augurs well for Russia and ill for those who persist in ignoring the only possible solution that can prove permanent—the adoption of modern methods and modern machines and tools. Undoubtedly the presence of American harvesting machinery and of the thousand and one other types of American agricultural

machinery and tools will make Russia a more formidable competitor of American farmers. We have no fears, however, that they will prove unable to advance in the future as in the past. Their prosperity will not be less because their friends in Russia are also prosperous.

NOT long ago the Public Works Commissioner of the city of New York called for bids from building contractors on a new steel viaduct that was to be built across a deep valley that intersects the extreme northern part of the city. The Board of Estimate and Apportionment, working on the basis of prices paid for such work in former years, appropriated \$900,000 for the work, its estimate being in exact figures \$883,000. There were twenty bids, and when they were opened it was found that the highest was for considerably less than \$800,000, while that of the successful firm

was for \$570,000, or considerably less than two-thirds of the amount appropriated.

The reason for this astonishing result is stated to have been the great progress that has been made in labor-saving devices for steel construction, and the incident furnishes an excellent concrete illustration of the cash value of this progress to those who are contemplating the erection of structures of this character. That the future will see an advance equal to that made in the very recent past is unlikely, but as regards the export field the preparations now being made or recently completed by some of the strongest manufacturers of structural steel in the country promise some notable savings to foreign buyers who are alert enough to seek the cheapest market, however distant.

ACCORDING to a recent article in the *Antwerp Journal of Maritime Commerce*, the official figures of the export trade of the leading nations of the world for 1896 as compared with 1872 show some very interesting fluctuations:

Countries.	Amount of exports.		Increase.	Relative rank.	
	1872.	1896.		1872.	1896.
England.....	\$1,235,200,000	\$1,422,000,000	\$207,475,000	1	1
United States....	430,583,000	1,050,692,000	620,109,000	4	2
Germany.....	559,700,000	994,156,000	384,456,000	3	3
France.....	726,066,000	656,393,000	*69,673,000	2	4
Russia.....	270,586,000	513,908,000	261,322,000	5	5
Austria-Hungary..	250,900,000	369,016,000	118,116,000	6	6
Belgium.....	193,000,000	283,324,000	90,324,000	7	7

\* Decrease.

The most remarkable feature of this statement is the decrease in the trade of France, which has fallen from second to fourth place. The trade of the United States, on the contrary, increased more rapidly than that of any other country, or nearly 150 per cent. in the twenty-five years.

Besides the countries mentioned, Japan, Australia and the East Indies have, in greater or less degree, increased their exports. France alone sees its trade gradually declining in the volume of the world's commerce.



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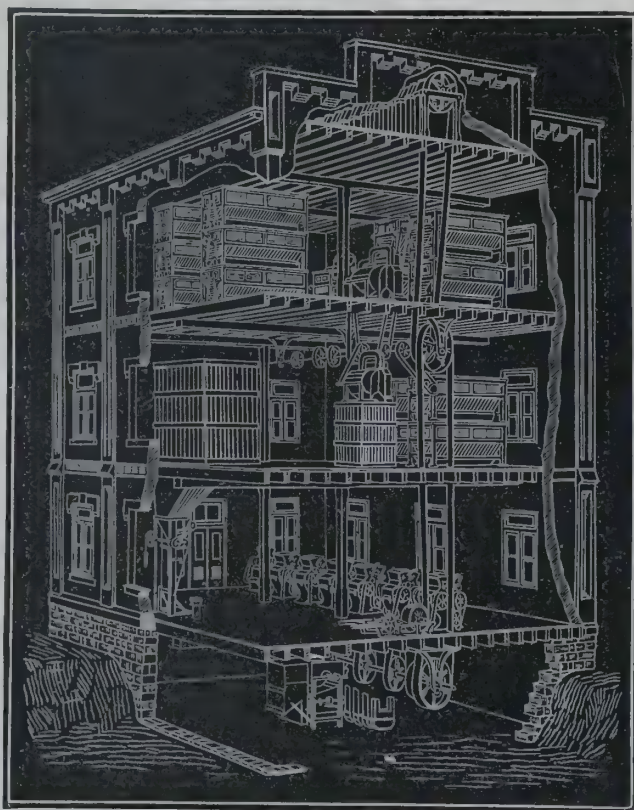
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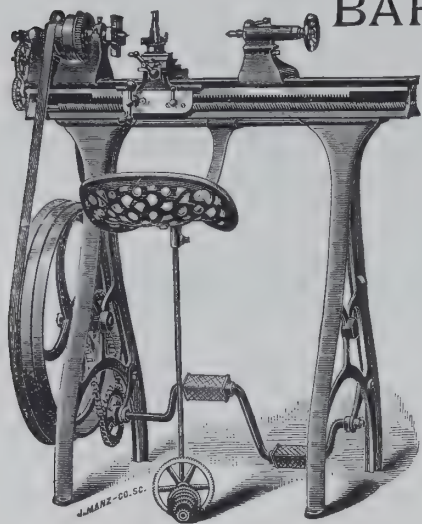


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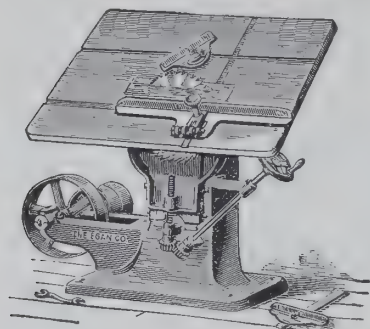
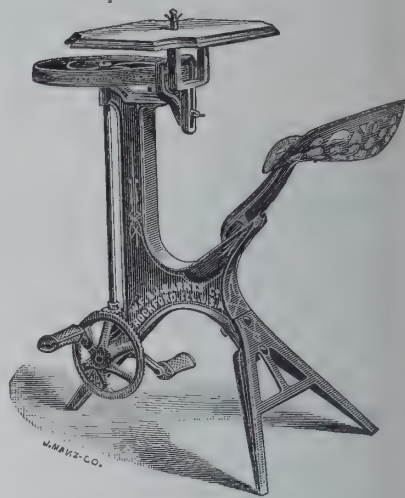
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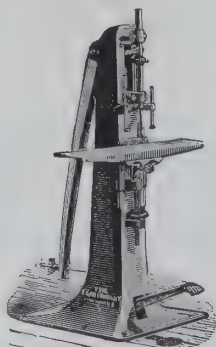
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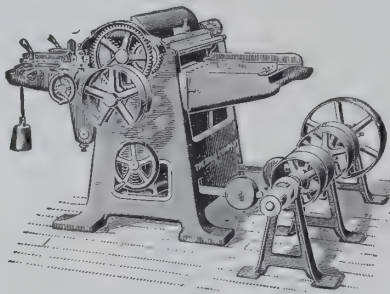
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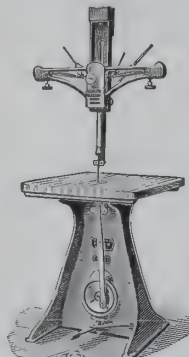
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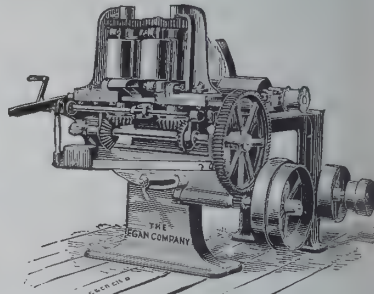
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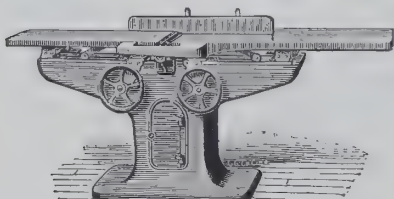
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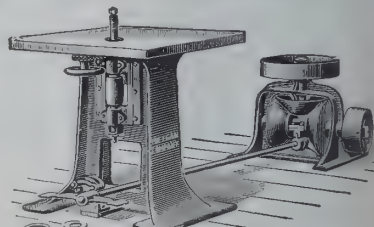


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## THE BEGINNING OF THE DIVERSIFIED INDUSTRIES OF THE UNITED STATES.

THE history of this country shows that a diversity of industries has had very much to do with the development, prosperity, growth in population and importance of its most populous and wealthiest sections. The best writers on political economy everywhere agree on the principle that any nation or state, or part of a nation or state, that confines itself to one line of industry, whether it be the manufacture of one class of goods or the cultivation of the ground to a certain crop to the exclusion of all others, results in the end in the entire business of the nation, state or section falling into the hands of a few men with capital or credit, who control the industry or special line of agriculture, and who become in a measure the wealthy and ruling class, small in number but powerful in influence, while the great majority gradually drift into a condition of dependence upon these few, with little chance to rise above a condition of barely comfortable existence, with small accumulations at the best and generally only a step removed from actual want.

It is often asked in other sections of the country, "What is it that has made New England and the old Middle States so populous, so rich, and so powerful in all material matters?" The question is well understood in the sections themselves, and it is easily answered. The whole secret is in the diversified industries, in which those sections, especially New England, early engaged; industries which did not depend upon great capital or surprising business ability for their development; industries which for years only reached modest proportions, and in most cases only gave their owners a modest competence, but which drew to them a great body of people from the old world, and in some instances, from other sections of this country.

The great factories and shops of New England, controlled by corporations with large capitalization, were not the growth of a day or a year, but of more than a century. They all sprang from very small beginnings, oftentimes from a little water mill, practically built by the owner, who was his own mechanic, and operated by himself and his own boys, or by the help of a neighbor or two, proprietor and employee often devoting a portion of their time to agricultural pursuits, but steadily developing the manufacturing, carefully adding to it by what profits accrued in its operation.

In one sense almost the entire people of the New England and old Middle States were the best exponents of true political economy, professors of the science without knowing that they were such, and with no pretense at anything but that hard common sense which taught them that to be independent of England and the rest of Europe, and to grow in wealth and political and financial influence they must manufacture, as far as able, what they needed for their own use, and if possible have a balance to export to other countries that did not possess our natural resources.

When this idea took root there were no capitalists in New England, New York, New Jersey or Pennsylvania in the modern sense of the word. There were a few comparatively rich men in the mercantile line, but there was little or no capital in this country that could be invested in manufacturing. But in the face of this seemingly prohibitory difficulty, the farmers of the country turned their attention to such manufacturing as they could do without outside capital and without materially interfering with the cultivation of their none too productive farms.

The country was interspersed with thousands of little streams and was so broken that there were abundant chances for building dams and obtaining water power for at least a portion of the year. At first there was no attempt to use this power except in the seasons of the year when water was abundant, the idea of making reservoirs being developed much later. There were few large streams that afforded water power with a good head and fall all the year round, but these were utilized with the crude resources then at hand. The idea grew rapidly and in a remarkably short time a large portion of New England became a veritable hive of manufacturing industry, all on what would to-day be called an insignificant scale. Every little stream soon had its small sawmill of the old-fashioned up-and-down style, operated by

the owner of the adjoining farm and his boys, or by the help of his neighbors who had no streams on their farms.

To these were soon added other machinery for the manufacture of household utensils, furniture and the like. It was not long before these little mills called into existence machine shops as a matter of necessity. They were also small, crude affairs at first, in which the proprietor was the principal workman, aided, as in the case of wood-working mills, by the members of his family or immediate neighbors who had picked up some knowledge of working in iron and steel, the proprietor often being the former village blacksmith.

Around these little shops of various kinds, as they grew in importance, began to cluster, not only the homes of the proprietors, but of his workmen: churches and schools were built, and in time the little hamlets expanded into villages, towns and cities, with great industries owned and operated by rich and powerful corporations, employing thousands of workmen, who in turn have millions of dollars in the savings banks of the country, which money has been loaned in vast sums to develop other sections of the continent.

Not longer than 150 years ago New England and much of the territory of the old Middle States was as densely forested as was any other portion of the country, and with about as valuable a growth of timber, saving perhaps the great white pine forests of the middle Northwest, and of some portions of the South. But, be that as it may, more wealth has been wrought out of those Eastern forests than from any other forests in any section of the country. And why? Simply because the industries have consumed all the timber, and they were from the very beginning endlessly diversified.

Great as were those forests there were never in this section, except, perhaps, in a portion of the State of Maine, and there not until comparatively recent years, any sawmills to compare with the great establishments which have been such a powerful factor in stripping the Western timbered States of their rich growth of trees. Had the New Englanders and the people of New York and Pennsylvania built great sawmills at the outset, and had they been exclusive lumbermen, cutting and shipping the forest product in its first stage of manufacture, there would be no such wealth or population in those States as there is to-day.

I call to mind a single township, perhaps six miles square, in the State of Massachusetts, in which no longer than fifty years ago there were not less than five little manufacturing hamlets or villages, besides the main central village of the original town. Each little hamlet became a centre of its own. In it, or close by on the small and rapid streams, were from one to half a dozen little mills, primarily sawmills of the old pattern, with a variety of other wood-working industries as adjuncts, such as making chairs and the cheaper forms of furniture, washtubs and waterpails, boxes, all sorts of turned work for a thousand and one different uses, household utensils of wood of every kind, and at last, in many of them, the old-fashioned sulphur matches of those days.

At that time, fifty years ago, the cotton industry had become very important in the New England States. Thread winding and thread making was an industry carried on to a considerable extent, and the factories were supplied from these little hamlets with spools, bobbins, shuttles and all that sort of wooden paraphernalia required in the manufacture of cotton goods in the winding of thread. In these little industries there was very seldom any capital except the small savings of the farmer owner, to which was added such credit as his sturdy integrity and untiring industry might give him.

To-day many of these little hamlets are abandoned. The little streams where it was not possible to build reservoirs to provide water for the whole year, for a time used small steam engines as an auxiliary, but as the timber became scarcer and capital increased these industries were combined in some place contiguous to lines of transportation, or where there was better water power, and the little mills were allowed to fall into decay. But, all honor to them, they were the parents of the great factories that dominate the East at the present time and make it so powerful in every material respect. The little sawmill, started on the little stream among the New England hills, where the father and his boys would saw a few thousand feet of lumber, turning or sawing a few hundred dollars' worth of chair or furniture stock, or make a few boxes, tubs or pails during the season of high water, opened the way for the great factories of to-day, and laid the foundations of the great fortunes now found in all those older sections.—O. S. Whitmore in *The Woodworker*.

The total production of cast iron in Russia in 1897 was placed at 4,119,620,848 pounds, or 559,736,000 pounds more than in 1896. The consumption during the year was 606,364,516 pounds. It will thus be seen that the home production falls far short of the annual consumption.



### American Iron and Steel Works in 1898.

THE fourteenth edition of the directory to the iron and steel works of the United States, Canada and Mexico, which has recently been published under the direction of Mr. James M. Swank, secretary of the American Iron and Steel Association, gives a very good idea of the present size and scope of the iron and steel trade of this country, and also of the progress made during the past two years since the last edition of the directory was issued. In the edition of 1896, after a pruning of all abandoned furnaces from the list there remained 469 furnaces in the so-called active list of that year, or just 100 less than in 1892 and just 50 less than in 1894. In the present edition, after still more thoroughly eliminating recently abandoned or long idle furnaces, and after allowing for new furnaces built since the directory for 1896 appeared, there are enumerated only 420 furnaces in the so-called active list. Of these furnaces it said about 50 will never make another ton of pig iron; so that there are to-day in this country not more than 370 furnaces that are either active or are likely to become active at any time in the future. Most of these are thoroughly equipped modern furnaces, and many of them are furnaces of great capacity.

The total annual capacity of the 469 furnaces that were described in the edition of 1896 was 17,373,637 gross tons, and the average annual capacity of the furnaces was 37,044 tons. In the present edition the total annual capacity of the 420 furnaces that are described is 19,081,587 tons, and their average annual capacity is 45,432 tons. A great increase in capacity from 1896 to 1898 is shown by these figures, notwithstanding the fact that many of the furnaces that were idle in 1896 but which then seemed, to their owners at least, to have a chance to run again in better times are now out of the race entirely, and with their transfer to the abandoned list of the present edition of the directory their capacity disappearing also. As already stated, there are probably 50 furnaces in the present list of 420 furnaces that are expected will never run again, because they are antiquated or badly situated, so that a perfectly fair estimate of the actual capacity of the completed furnaces in this country to-day will place it in round numbers at about 18,000,000 tons.

The steel works portion of the directory shows 45 Bessemer plants, with 100 converters, against 50 plants and 109 converters in 1896, and an annual converting capacity of 10,633,000 gross tons to-day, against 9,602,450 in 1896. No new Bessemer plants have been built since January, 1896. The capacity of the 286 open-hearth furnaces built and building is 3,522,250 gross tons; the 245 of 1896 had a capacity of 2,430,450 tons. The prominence of basic steel is emphasized in the lists, as well as in the annual statistics of production. In 1898 there are 47 plants prepared to make direct open-hearth castings, as against 35 in 1896 and 28 in 1894. Of the 45 crucible steel plants in the country, the annual capacity is 95,000 gross tons; in 1896 it was 98,700 tons.

The present volume describes 504 completed rolling mills and steel works, of which 462 contain trains of rolls and 42 have no rolls. In the two years, 32 new mills have been built and 33 abandoned, a net decrease of 1, but the rolling capacity in April, 1898, was 17,929,850 gross tons, against 14,763,920 tons in January, 1896. In puddling furnaces there has been a decrease in the two years from 4,408 to 3,889. The changes in plants representing the various ramifications of finished material are not so pronounced. There are 51 plants rolling rails of various descriptions; 66 manufacturing various forms of structural material, including bridge rods, bridge plates, structural tubing, etc.; 230 plate, sheet and skelp mills; 69 completed tin plate works; 46 cut nail mills, with 4,544 machines; 24 wire rod mills, 74 wire drawing plants and 53 wire nail mills; 121 car-building works, 62 car-axle works, 110 car-wheel works and 24 locomotive works; 33 cast iron gas and water pipe works; 28 wrought iron and wrought steel pipe works; 30 seamless drawn steel tube, brazed tube and lock-jointed tube works; 117 bolt, nut and rivet works; 88 malleable iron works, 66 stamping works and 12 horse-nail works; 44 iron and steel ship yards, and 87 iron and steel bridge building works. The lists of blast furnaces, rolling mills, and steel works in Canada and Mexico which were first given by the directory for 1892 have been revised this year. Canada now has 8 completed blast furnaces and 1 building, 17 rolling mills, and 1 open-hearth steel plant, while Mexico has 21 completed blast furnaces and 2 building, 7 rolling mills, and 2 partly completed open-hearth steel plants, of which one will certainly be built. All the completed iron and steel enterprises in Mexico are small.

A Belgian consular report says that of the 173 exhibits in the Permanent Machinery Exhibition in Lima, Peru, 112 are composed of articles manufactured in the United States, 29 of articles made in Germany, 17 of articles from Peru, 8 from England, 6 from France and 1 from Switzerland.

### The Armament of the American Navy.

IT is well known among those familiar with the subject that one of the characteristic features of the vessels of the American navy lies in the great weight of guns which they carry. This is but a continuation on our part of an old policy. It has always been considered by our naval authorities that a commanding factor in our naval success during the war of 1812 was the superior weight of guns in our ships. The New York *Herald* of July 14th reports an interview with Admiral Lord Charles Beresford, in which this significant statement is made, "That our [the English] ships are underarmed is not only my opinion, but that of many other naval officers."

We do not know to how great an extent these opinions are the result of the recent engagements at Manila Bay and at Santiago, but it is certain that until recently the general opinion in England, or at any rate the opinion of those in authority in the English navy, has been the reverse of those cited. It has been a source of frequent criticism there that the apparent strength of our ships is elusive because of their alleged overarmament. Our naval constructors, in fact, have been considered almost reckless in putting a weight of guns on our ships which it was declared they were unable to carry in action, and which was sure to destroy them whether it did the enemy or not. Whatever may be thought of the engagements at Manila Bay and Santiago as regards the merits of the fleets engaged, there can be no doubt that they have demonstrated the wisdom of our policy of heavy gunning, and the lesson is likely to be heeded by the naval constructors of all nations.

To our mind the comparatively light armament of the British navy is but another illustration of a British characteristic. The Englishman seems to be constitutionally afraid to exact a maximum duty from a given amount of material. As is well known, his engineering structures of all kinds are, from our standpoint, ponderously heavy, being in fact built as though intended to last forever—as, in fact, some of them bid fair to do. We are by no means disposed to claim that our general practice in this respect is necessarily superior. It is at least an open question if many of our machine tools, our engines, and especially our boilers, would not be decidedly improved if in this respect they were to be made more on English lines. When it comes to a battleship, however, it is not the object of its existence to last forever, but to do its maximum duty in its supreme hour of trial. In view of the results which are still fresh in our readers' minds, there can be no room for doubt that in this field our practice has been sound.—*American Machinist*.

### Uses of the Gas Engine.

ACCORDING to a high German authority the distribution of 2,323 gas engines throughout thirty-six representative German cities is as follows: As these cities range in population (1890) from 3,000 to 348,000 with an average of 68,000, they are excellently illustrative:

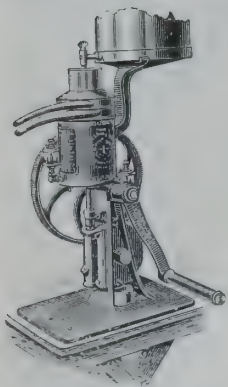
Industry.	Percentage.
Printing and lithography .....	14.4
Pumping .....	8.6
Textile .....	7.9
Electric lighting .....	7.6
Machine shops .....	5.3
Joiners and cabinetmakers .....	5.0
Butcher and sausagemakers .....	5.0
Locksmiths .....	4.2
Coffee roasters .....	3.1
Cutlery .....	2.9
Elevators .....	1.6
Total .....	65.6

The remaining 34.4 per cent. is scattered throughout 140 more industries. This would seem to prove that the gas engine is largely the motor of the small industries; but it should also be remembered that Germany is the land of small industries.

**The South African Oil and Color Trade.**—This trade is a very considerable one, and it is gratifying to know that the greater part of the imports are in British hands, but the Americans are waking up in this direction, and in lubricating oils and greases, ready-mixed paints and varnishes and colored distemper powders their productions are of good value. The sheet of sample tints and directions issued gratis by Messrs. Billings, King & Co., of New York, is an eye-opener for home makers to consider. The "Pine Tree" brand of American turpentine, which is put up into one-gallon square drums, is commanding a big sale.—Correspondent of *The Hardwareman*, London.



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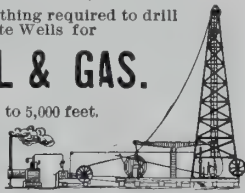
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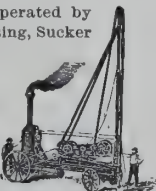
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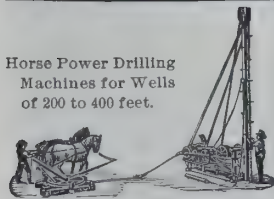
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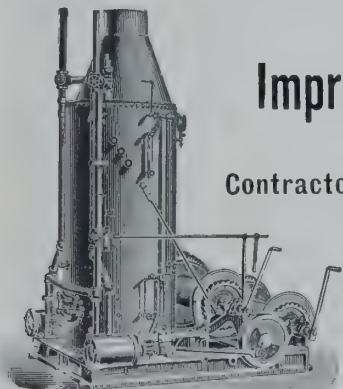
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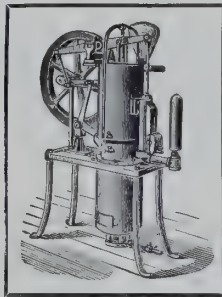
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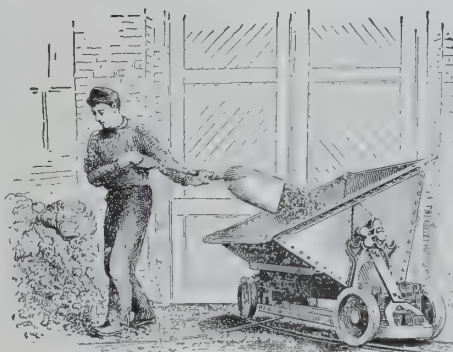
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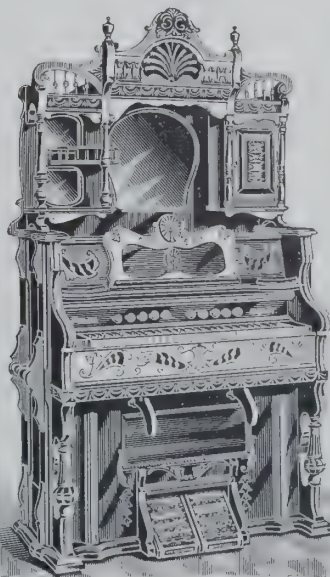
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## AMERICAN STEEL RAILS—PAST AND PRESENT.

THE first steel rail ever made in America was rolled at the old North Works of the North Chicago Rolling Mill Co., and up to the time of its merging in the Illinois Steel Co. that company had made over one million tons of steel rails, a large proportion of which is still in service. The traditions and experiences of that company, therefore, cover the whole history of steel rail making in this country, and might reasonably be expected to furnish food for reflection.

"The manufacture of steel rails on a commercial scale in Chicago began in 1872. For the first decade there was no serious complaint as to quality. The immense superiority of steel over iron, even in the face of the very high cost of the former, was so marked that almost any kind of a steel rail was accepted. Then, as demand increased and the various processes of manufacture were cheapened, together with the enormous increase in output and corresponding severity of competition, the prices of steel rails steadily fell until the low point of 1885 was reached. Then it was that the railway people began to be harassed with doubts as to quality. The weight of rails was being increased, though not at all in proportion to traffic, and it was only too evident that increase of weight did not bring increase of service. It was manifest that the new heavier sections were actually not wearing as well as the lighter rails of previous years. It seemed a reasonable deduction to railway managers that the cheapening of cost of rails was being procured by the use of inferior raw materials. To this the makers retorted that it was impossible to make steel at all out of anything but the best materials, so they could not employ poor materials even if they desired to. The situation was an uncomfortable one and the life of the maker of rails was not one to be envied. Many efforts were made to secure steel that would duplicate the quality of ten years previous. One notable instance was that of a certain large Western road which had, in 1876, purchased a lot of 56-lb. rails. At that time the mill employed a hammer for blooming ingots instead of blooming rolls as now, and happened to be using in their mixture of pig iron about 20 per cent. of charcoal iron, which at that particular time was more available than coke iron. This lot of rails so made gave excellent service and have ever since remained the criterion on that road. Accordingly, in 1885, in the desire to improve the wearing qualities of their heavier section, this road placed an order with the same mill for rails to be a duplicate in every particular of manufacture of the rails of 1876, including the charcoal iron and hammered blooms. The last was an impossible condition, as the hammer had become an obsolete machine, but the rails were made with a mixture of 20 per cent. charcoal iron, which had now become somewhat of a luxury. Yet these rails did not wear like the rails of 1876. As the only apparent difference was the hammering of blooms, this circumstance gave rise to much learned discussion on the relative merits of hammering and rolling.

"The beau ideal of steel rail in those days was the John Brown rail, made by that English firm in the early days of steel rail manufacture. Wherever used they gave excellent service, and American makers were continually twitted with the fact that they were never able to equal the earliest product of the Bessemer process in England. Indeed, it began to look as if the more familiar we became with this process the less successful we were with it, as far as quality was concerned.

"Up to the time of the appearance of new types of section, the acme of perfection was thought to have been reached in the Pennsylvania 75-lb. rail. The basis of this design was a 56-lb. rail, which was increased to a 60, a 70, and a 75 lb. section by constant increments to the head only. It is a fact that the same angle bar fitted each section from the 56 to 75 lb. Since the head was the vulnerable part of the rail, it seemed to be incontrovertible that the larger the head the longer the wear. The history of the service of heavy rails has fully exposed the fallacy of this idea. The failure of rail sections has been due to the same cause that the failure of many men can be attributed, namely, an attack of 'big head.' No one can appreciate the reason for it as well as the manufacturer, but even he did not find it out until a direct comparison of sections was made. The constant aim of the manufacturer is to keep the percentage of second quality, or defective rails, as low as possible, and naturally he has a fondness for those sections which invariably yield the least seconds.

"The more nearly equal the head and flange are in weight, the easier the rail will be to roll, the more uniform the metal will be in density, and the better the rail will wear. With the adoption of what are known as the American Civil Engineers' rail sections and their liberal use, many of the difficulties of quality, wear and manufacture have disappeared.

"The question of chemical composition, after many years of heated dis-

cussion, is permitted to rest. The adoption of common sense sections has largely dispensed with the necessity of trying to explain rail failures by chemical composition. The early products of the Bessemer converter should have taught us that, but it didn't until after years of heart-breaking experience.

"Modern heavy sections make it possible to increase the content of carbon in the steel with advantage to all concerned. I am convinced that a considerable increase in the percentage of silicon will be beneficial. Some experiments that have come under my observation within the past two years have impressed upon me the great value of considerable percentages of silicon in steel.

"The rail is at once the least ostentatious and most vital element of railway construction and maintenance. The invention of Bessemer has rightly been assigned the place of honor among inventions of modern times; as, by means of it, the cost of transportation has been very greatly reduced, immense areas of hitherto inaccessible farm lands have been made available, and the food of humanity greatly cheapened. Through Yankee ingenuity the cost of the steel rail has been brought, in less than thirty years, from \$150 per ton in gold to less than \$20 per ton, or one-eighth of the original cost. The rail is to-day the cheapest finished product in the whole domain of iron and steel manufacture, and is at the same time the most difficult to make. It requires the expenditure of at least three million dollars before a single rail can be economically turned out. One of the most complicated and delicate operations known to metallurgy is carried on at the tremendous rate of over a ton of product per minute, day after day, within limits that will not permit of a variation of more than five one-hundredths of one per cent. either way from the standard. When you are considering the rail, ponder these things well. Do not burden the maker with unnecessary difficulties or embarrass him with galling restrictions. When rails do not give the service expected, see if the location, character of service or design of section has not something to do with it. In closing, I will repeat what the history of twenty-five years has proven, that, other things being equal, the best wearing rail is the one easiest made."—E. C. Potter in the *Railway and Engineering Review*.

## American Tools, Agricultural Machinery and Bicycles in Norway.

A CORRESPONDENT of the *British Trade Journal* has just written an account of his visit to the International Fisheries Exhibition which is in progress in Bergen, Norway, this Summer. In addition to the Norwegian displays, which predominate, there are exhibits from Sweden, Denmark, Russia, France, Germany, United States, Japan and other countries. What struck the correspondent more than anything else was the almost complete absence of British representation. There is a good deal of cutlery, chiefly ornamental cutlery, and mostly of an indifferent character, at the exhibition. The Germans and the Swedes appear to have the cutlery business to themselves. The correspondent adds:

"In none of the public places, not even the hotels, did I come across a single knife or fork with a Sheffield name upon it. The German and Swedish cutlery, particularly in pocket knives, was very poor stuff. In edge tools American axes and adzes were quite common, and here and there I came across chisels, files, rasps, and several other tools, bearing well-known Sheffield names. At four places the saws with which the men were working were made in Sheffield. In the lighter range of agricultural implements, such as hayforks, cultivators, rakes, spades, etc., "U. S. A." was pretty universal, the "Keystone" brand having the bulk of the business. Bicycles are not greatly used in Norway, the country scarcely lending itself to that form of pastime; but they are abundant in Bergen, where of ten machines examined, I found eight to be of American make."

**Fans in Sleeping Cars.**—The Baltimore & Ohio Railroad has recently adopted the use of electric fans on its sleeping cars. This road, like many great trunk lines, has sleeping cars which lay for several hours awaiting the departure of trains, thus enabling the passengers to retire several hours before the time of departure of the trains. Ordinarily, a railway station is about the hottest place that can be found at night in the Summer, and the interior of a sleeping car is still hotter, if such a thing can be. The fans are placed in the cars as soon as they are backed into the stations, connected by a flexible cable with the electric current, and they are run until ten minutes before the train leaves, thus keeping the interior of the car cool and pleasant for those who are sleeping. The cost is very small, as each station is thoroughly equipped with electric appliances.





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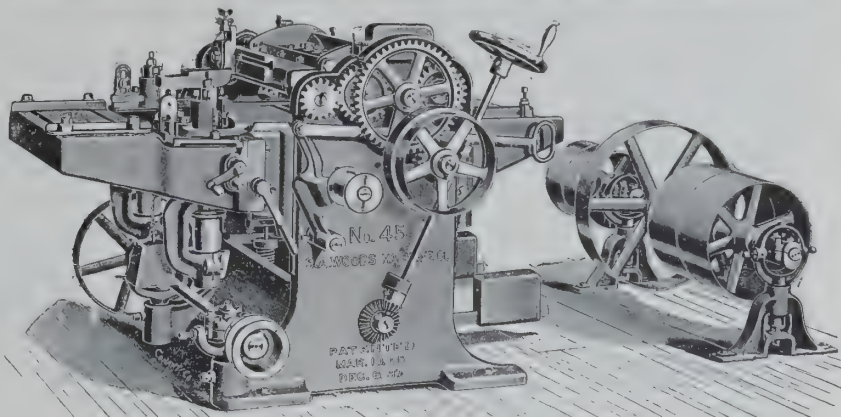
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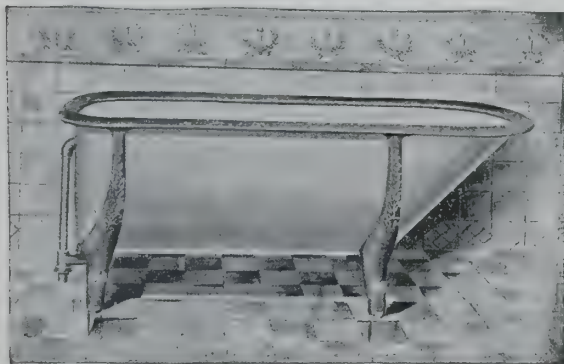
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### REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.  
MILLS EDWARD. Master Schooner "Florence Shay."



## HOW MODERN WIRES ARE MADE.

**W**IRE-MAKING practice has of course changed in recent years as have most manufacturing processes. The earliest forms of wire were hammered from rough bars. This crude way was superseded later when it was discovered how to draw, and this method of wire drawing is now universally applied for wires of any material.

In the case of iron wire, the metal is first converted from "blooms" to "billets" and from "billets" to "rods" at one heat. This is accomplished by long train rolls which pass the rods from one to the other. The rods average from 2 to 600 yards in length. Very large sizes of wire may be made by continued rolling of the rods.

The rods thus produced by rolling in the heated state are made into wire by the process of "cold-drawing." By this process the rods of iron and steel, rolled several hundred yards long, are first pointed at one end by hammering or by a special machine, and are then cleansed by washing in a bath of dilute sulphuric or hydrochloric acid, and afterwards are immersed in lime-water to give a drawing surface. After drying by heat they are ready for the drawing mill, which consists of a series of horizontal drums or pulleys, 10 to 30 inches in diameter, termed "blocks," mounted on vertical axes on long benches. Accompanying each drum are drawplates and pincer drawers. The drawplates are disks or blocks of cast steel drilled with tapering holes, the small ends of which correspond exactly to the size of wire to be drawn from it. The form of the hole, of course, determines the form of cross section of the wire, which is usually circular, though not necessarily so. When the holes become worn from use and depart from their original gauge, the metal is hammered around the small end, closing it, after which it is reamed out to standard size. Where great uniformity of gauge is required, as in fine gold or platinum wire, perforated rubies or similar hard minerals are fitted in the drawplate. The drawplates are clamped in vises fixed to the bench. As the tapering end of the rod is inserted in the hole of the plate, mechanical pincers seize it and pull it through. The pincers are fixed on horizontal arms, which are moved backward by cams fixed on the axes which rotate the drums. The wire as it is pulled through by the pincers is wound on the drums. The bottom of the drum is fitted with recesses to correspond with projections on a cam mounted on the same axis. The drum can be raised so as not to be in contact with the cam, and then may be turned freely on a spindle. When enough wire has been drawn through the drawplate by the pincers to make one turn round the drum, the wire is taken from the pincers and fastened to the drum, which is lowered, and the cam fitting in its base turns it and winds the wire upon the drum. The drums draw from 500 to 700 feet per minute for ordinary wire, and somewhat slower for crucible steel. The wire has now been drawn down one size, reducing the diameter about 10 per cent., and the process is continued until the proper gauge is attained. It is said that copper wire may be reduced fifteen sizes at one drawing. In continuous wire-drawing several drums are placed in line on a frame so that the wire winds on and off each one successively. Between the drums rotating disks, made of some extremely hard substance reamed out to size, are placed so that the wire passes through them. The holes in the succeeding disks are smaller than those in the preceding ones. Thus the cross-section may be reduced a number of sizes in one operation. Of course, the speeds of the drums are proportional to the elongations produced by the reducing of the diameter of the wire, and have to be very exactly regulated so that there may be no undue stretch or slack between the drums. The drawing is facilitated by the application of lubricants; a kind of grease for the larger grades, and liquids such as soapy water and milk for the smaller. Where a straw-colored wire is not objectionable, a weak solution of copper sulphate is used as the drawing liquor. These lubricants coat the wire with a mucilaginous or metallic film, so as to preserve it from oxidation and leave a polished surface.

Wire-drawing increases the hardness of the metal, so that the wire has to be frequently annealed during the process. In practice, fine wire is thus softened six or eight times. The annealing pots consist simply of metal chambers into which the wire is placed, and the pot is then hermetically sealed. The process of heating requires several hours at a red heat, a temperature of 600 to 700 degrees F. being best. The pots and their contents are then allowed to cool slowly. An average charge for a pot is two and a half tons of wire.

Steel commonly used in the wire trade contains from one-tenth to one per cent. of carbon. Four-tenths per cent. of carbon in the steel used would make steel spring wire, five-tenths ordinary wire rope and six-tenths of one

per cent. piano wire. Where toughness is required the per cent. of manganese may range as high as seven-tenths of one per cent.

The process of wire-drawing greatly increases the strength of the material from which it is drawn. Thus it has been found possible to temper steel wire to sustain a load equivalent to 190 tons per square inch, while 70 tons is considered large in test pieces of hard steel. Such wire, however, is not of practical use, because it is exceedingly brittle, and the brittleness increases very rapidly in proportion to the strength toward this limit. A strength of 150 tons is considered the greatest that can be combined with the essential ductility and elasticity.

Copper wire is manufactured by rolling ingots or billets into rods in the hot state, and drawing them as in the case of iron wire. Its great superiority over iron in conductivity and its freedom from electro-magnetic induction, give it an immense advantage for electrical uses. Its greater price per ton is compensated by its lesser weight per unit of resistance. It has been shown on a copper and iron line 278 miles in length, whose resistance and capacity were rendered equal, there was an increase of speed of nearly 13 per cent. as compared with iron wire. Though a large part of the telegraph service is supplied with galvanized iron wire, copper alone is employed for the long-distance telephone, the electric light, and the transmission of electric energy.

Of the other metals and alloys employed in the manufacture of wire, the most important is silicium bronze. This alloy was patented by Weiller, of Paris, in 1882, and is formed by adding silicium and sodium to copper in a certain manner. The properties of this metal show a conductivity of 40 to 98 per cent., that of copper three to six times that of iron, although only one-fourth the weight, and tensile strength nearly equal to that of steel. It will not oxidize readily, and will therefore last almost indefinitely, and in France is rapidly superseding iron and steel in electric transmission. It may be made of varying strength, but its conductivity rapidly decreases as it approaches its tensile limit. That recommended for telegraph wires is an alloy showing a conductivity of 80 per cent. that of pure copper, and a tensile strength of 35 tons. When iron is used the conductivity is 16 per cent. and the strength about 25 tons, showing the silicium bronze to have five times the conductivity of, beside being much stronger than, ordinary telegraph wire, weight for weight. With a strength of 50 tons it still shows a conductivity two and a half times that of iron.

Aluminum is not regarded as a useful metal for wire manufacture, its tensile strength in this form being only 10 tons, and its elastic limit very low.—A. L. Orton in *Journal of Engineering*.

## English and German Trade.

**A** COMPARISON of English and German trade for three years, from 1895 to 1897, inclusive, is as follows:

IMPORTS.		
Year—	Great Britain.	German Empire.
1895 .....	£356,747,287	£206,033,450
1896 .....	385,575,241	215,358,156
1897 .....	391,638,506	229,453,350
EXPORTS.		
Year—	Great Britain.	German Empire.
1895 .....	£225,890,016	£165,895,000
1896 .....	240,145,551	176,256,500
1897 .....	234,350,003	176,030,200
INCREASE OR DECREASE OF IMPORTS OVER PREVIOUS YEAR.		
Year—	Great Britain.	German Empire.
1896 .....	*£28,827,945	*£9,324,706
1897 .....	*6,063,265	*14,095,194
INCREASE OR DECREASE OF EXPORTS OVER PREVIOUS YEAR.		
Year—	Great Britain.	German Empire.
1896 .....	*£14,255,535	*£10,361,500
1897 .....	+5,795,548	+226,300

\* Increase. + Decrease.

The tables show that for 1897 British imports for home consumption had increased by £6,063,265, whereas those of Germany had risen by £14,095,194; and that British exports of domestic produce had fallen off by £5,795,548, whereas German exports of the same description had diminished by £226,300. But of the total loss in British exports from 1896 to 1897 £5,248,000 was in the exportation alone of "cotton and cotton goods." The net result is an advantage of £5,569,248 for the year 1897 for the German Empire, for the losses are £5,795,548 for Great Britain and £226,300 for Germany. The export trade in both countries seems to have received a considerable check last year.

The Executive Council of Hawaii has signed a contract with the Scrymser Company, of New York, to lay a cable from San Diego, Cal., to Honolulu, and from there to Japan.

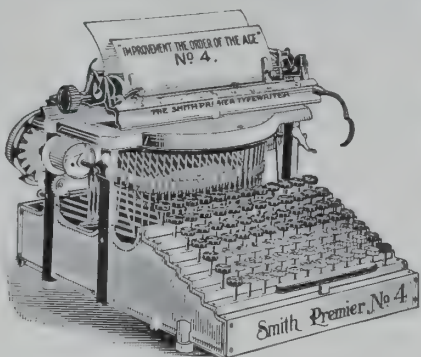


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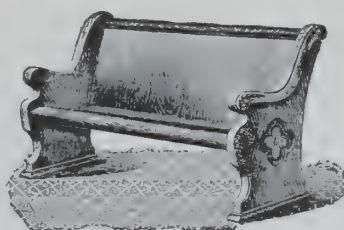
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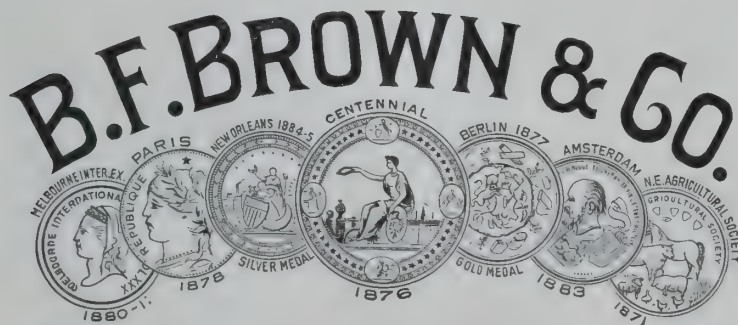
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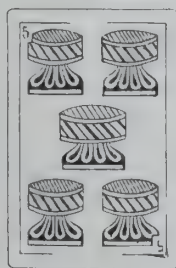
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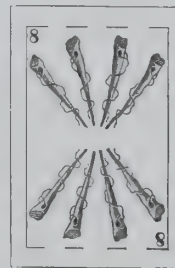


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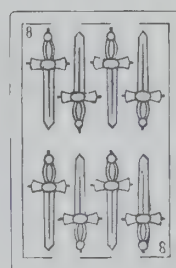


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*For the guidance of those who handle and use Machinery.*

Increasing the diameters of pulleys increases the belt speed, and therefore increases driving capacity of belts.

The hair side of a belt should always be next the pulley, for it not only has a higher coefficient of friction, but wears better, being liable to crack and break if exposed to the expansion and contraction to which the outside is subjected.

The practice of putting idlers against belts to increase their driving capacity is a most pernicious one, wasteful alike to the belt and to the power; they should never be used except under extraordinary circumstances. Sometimes an idler may be used with a belt as a clutch, and in some cases as a bearing pulley to carry a belt free from obstructions.

Shafting should not be fully lined up until all machinery on upper floors is in position. When hangers are attached to floor timbers or ceiling, and the floors are then loaded down with machinery or material, the shafting will always be found badly out of line from the effects of springy floor and timbers. By all means avoid making a storehouse of buildings where line shafting is extensively used.

Lubrication is not required for rolling motion, as is shown by the fact that we do not put oil or grease on the rail; and yet the periphery of the wheel, where it is in contact with the rail, has a much greater speed than has its boss where it touches the journal; but this latter requires much lubrication, the explanation being that in the first case there is rolling motion, and in the second sliding or scrubbing motion.

An oil is never good enough unless it is just right for its place; but you can't always decide by the common signs. Some bearings are difficult to lubricate, and some are easy. The difficult bearing must have its oil just right and tells you when it is wrong. The easy bearings do not always tell when the oil is wrong, but they require more power to turn them than when the oil is right. The majority of bearings are the easy ones.

A quarter turn belt can never be as economical as a straight, open belt, as it has all the defects of an open belt besides one of the worst kind of its own. The tension doesn't come right on the pulleys, but draws wonderfully to one side, producing slip that means a great loss in power. If a quarter turn belt must be used, a thick, narrow belt will run better than a thin, wide one, and if the edges are bevelled so that the belt will lay up hill it will certainly be an improvement.

It is not only in the management of the engine and boiler where power is lost directly, but if power is lost in any other part of the mill so that it drags upon the engine, no matter however careful or economical this part may be attended to, the effect in the end is the same. Every pound of resistance that is necessary which is brought to bear upon the engine means just so much unnecessary wear, not only upon the engine, but the boiler also, and only hastens the time when expensive repairs will become necessary.

As it is a difficult matter, says an authority, to balance any fast-running pulley so as to form a perfect running balance, all such pulleys should have sufficient thickness of rim to admit of being turned both outside and in; and then when placed upon the balancing bars, should any difference in weight in the opposite sides manifest itself, we may know that it is in that portion between the arms and directly opposite to each other, and by chipping off a part of this superfluous weight a perfect running balance will be formed.

The slipping of a belt when driving is a bad feature, and shows poor engineering. It indicates an overloaded belt, and should never be permitted more than 2 per cent. If you note the speed of a driven shaft and see if it is over than 2 per cent. less than it should be, the slip will then be excessive. Tightening the belt will help, but if it does not a wider belt is the remedy. Slipping produces heat, increases the temperature of the belt and has the effect on the leather that you all know comes from heating leather—burns it, besides decreasing the coefficient of friction.

Very little has yet been published concerning the action of oils in common use on metals with which they are brought in contact when employed for the lubrication of machinery; and as the subject is one of importance, especially to manufacturers of compound lubricating oils, and to those who use such oils, we give the results of experiments carefully made and extending over a period of twelve months. It was found that iron is least affected

by seal oil, and most by tallow oil when it is not de-acidized. Brass is not affected by rape oil, least by seal oil, and most by olive oil. Copper is not affected by mineral lubricating oil, least by sperm oil, and most by tallow oil. Mineral lubricating oil has no action on zinc and copper, acts least on brass, and most on lead. Tallow oil acts least on tin and most on copper. Lard oil acts least on zinc and most on copper. Sperm oil acts least on brass and most on zinc. Seal oil acts least on brass and most on copper.

Internal corrosion of steam boilers is a subject of much importance to engineers and steam users, for it probably causes many explosions. Silently and surely it does its work, until a final failure without warning is the result. There seems to be no rule concerning its action, for where two plants are in the same vicinity one will be affected while the other will escape the evil. One case is reported, and there are others like it probably, where two boilers were in a battery, doing the same work and using the same water, but one of them was corroded on the shell, while the other showed it on the tubes. What caused the difference is still a mystery. The plan of analyzing the water used in such cases, and providing a compound suitable for it, seems to be the most sensible course to pursue.

## The Depreciation of Tools.

IN estimating the value of a manufacturing plant, either for inventory purposes or for a statement of assets, one of the most uncertain elements to be considered is the real value of the tools. In the case of a machine shop, for instance, large sums have been expended for machine tools, lathes, planers, drill presses, etc., while the motive power, engines, boilers, shafting, pulleys and other details, all represent investments which while at work are returning interest upon their cost, but which are also constantly depreciating at an unknown and variable rate.

Investigation of the practice of existing shops reveals almost infinite methods of treating this feature, each shop having its own method and no two systems being exactly alike. Some make no attempt at system, merely estimating the value each year, practically only another name for guessing. Others keep an elaborate record, based on the first cost of each machine, depreciating at a fixed percentage rate every year, quite regardless of the fact that the value may bear but small relation to the cost in the first place, and none at all after a few years.

The question is really one which cannot be answered categorically, and no hard-and-fast rule is possible where so many conflicting conditions enter, but some attempt at system is better than no system at all, even if a certain amount of judgment (or guessing) must be exercised after all. Certain standard tools depreciate very slowly by wear and tear, and if a moderate expenditure is made to keep them in good order it is practically safe to estimate their value at a cost of their replacement. In most instances, however, other points must be considered. Among these a very important one is the fact that a tool or machine may be obsolete in a comparatively short time, and although in perfect condition the owner may simply be unable to afford to use it in competition with rivals possessing machines of later design, greater capacity, or more economical performance. The invention of an improved machine for baling cotton, for instance, might render almost valueless hundreds of thousands of dollars' worth of cotton compresses and their attendant machinery, although the latter are now carried as valuable assets in inventory lists. Even when no radical advance is made, the steady improvement in capacity, speed and perfection of product of modern tools is a factor which has the most important influence on the relative value of older machines. In such cases the question is not "how much is the old machine worth?" but "how soon will it be obligatory to us to replace it?"

## Encouraging Employees.

A PROMINENT Cincinnati manufacturing company has a notice posted in each room of its large works that reads about as follows: "Desiring to encourage our employees in the use of their thinking powers, as well as their manual labor, we will pay \$100 semi-annually in prizes to the five men in our employ, exclusive of foremen, who, during each six months, shall make the best suggestions in relation to the work, patterns, jigs, templates or tools, prizes to be \$80, \$25, \$20, \$15 and \$10 respectively. Write your suggestions and place them in the boxes provided."

It seems as if that should be the means of getting some good results, for it is often the case that a man has a good idea that he does not speak of for fear he will not get any credit, yet at the same time it is not of enough value for him to try to protect it by a patent. By this means he is encouraged to show what he has been thinking of.



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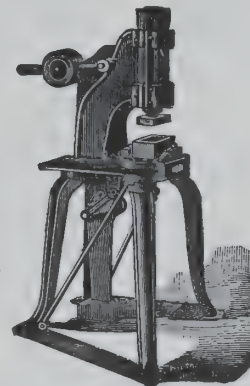
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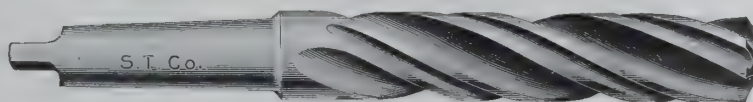


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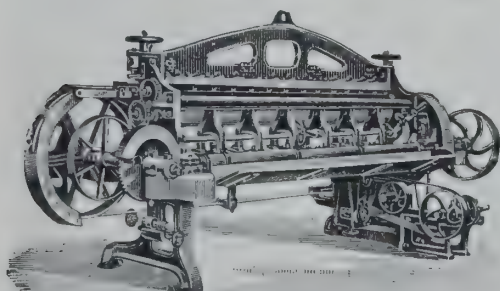
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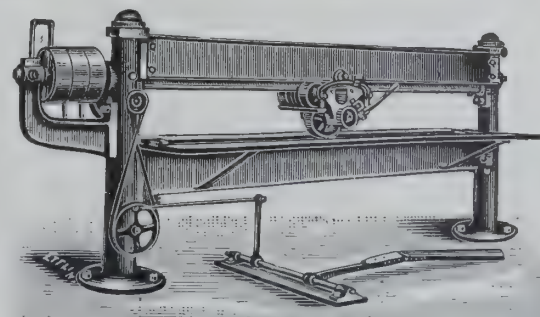
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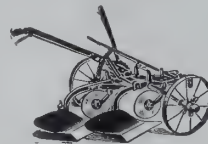


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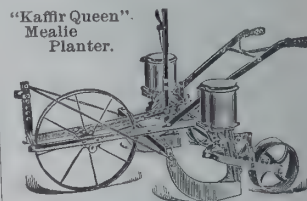


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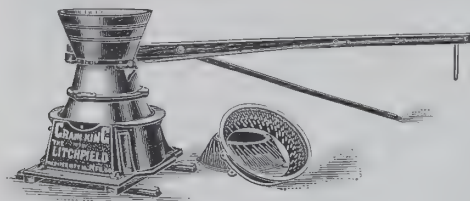
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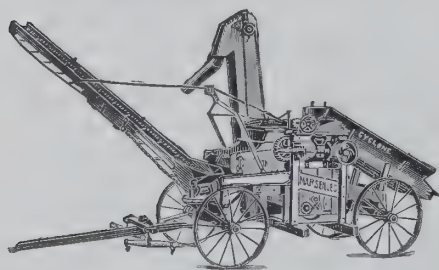


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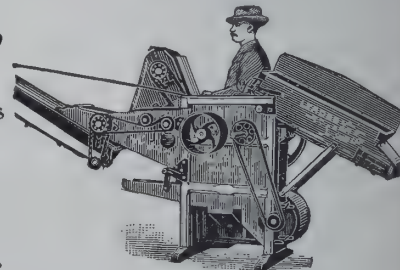


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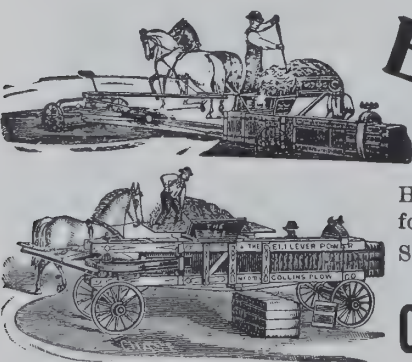
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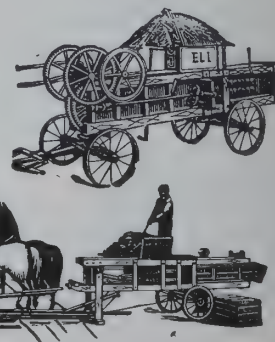
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*Devoted to the Foreign Trade in Agricultural Machinery and Implements.*

## REDUCTION OF DUTY ON AGRICULTURAL MACHINERY IN RUSSIA.

THE American Consul General at St. Petersburg, Russia, writes that the long-promised reduction of the duties on farm machinery and implements has at last taken place.

During the years 1895-96 the Ministry of Finance and also the Ministry of Agriculture and Crown Domains received applications from several agricultural associations and private persons, interceding for an improvement in economical conditions of the agricultural industry, as the prices of farm products in the international market were rapidly falling. This, they claimed, could be facilitated by reduction of the price of agricultural machinery, implements and manure. Owing to the present condition of agriculture and of the machine-building industry in Russia, the duty on foreign agricultural machinery, amounting to 35 cents per 36 pounds, is excessive and prevents the general use in Russia of the latest improved implements. The manufacture of agricultural machinery in this country has made considerable progress, owing to the protective tariff, but is still unable to satisfy the requirements of the agricultural industry, as many machines and implements, especially complicated and patented apparatus, are not manufactured in Russia. In view of these facts the farmers and agricultural associations have requested a material reduction or entire suspension of the duty on such machinery and manure.

Furthermore, in order to assist the home production of wine and enable it to resist the various diseases of the vine and other plants, the Ministry of Agriculture and Crown Domains has considered the question of importing, duty free, chemical products and apparatus to be used for this purpose.

In transmitting the requests to the Ministry of Finance the Minister of Agriculture said that it would be too much to put all agricultural implements on the free list, but that it would benefit the agricultural classes to remove the duty from implements and machinery not manufactured in Russia.

In view of these recommendations, the Minister of Finance appointed a commission consisting of representatives of the departments of Finance, Agriculture and Interior, as well as of farmers and manufacturers, to consider the subjects in detail. This resulted in a recommendation that agricultural implements and fertilizing substances be admitted free of duty into Russia, as follows:

(1) Such agricultural machinery and implements as are not produced in Russia, and the production of which requires special technical facilities, or which are patented, and therefore cannot be established in the near future, viz., harvesting and stacking machines, sheaf binders, steam plows, complex threshing machines with double drums, tedders, horserakes, assorting machines for grass seeds, assorting machines for potatoes, manure spreaders, pulverizers for sprinkling vines and trees, injectors for sprinkling sulphurous carbon under the roots of the vines in order to destroy the phylloxera, interrupted grape pressers, centrifugal cream separators and their parts, etc.

(2) Cloth for sheaf binders, stackers and assorting machines.

(3) Special twine for stackers made of manila hemp.

This twine formerly paid a duty of 52½ cents per 36 pounds, and the import of it duty free is even more desirable than the import of the stackers or sheaf binders themselves, as these latter, weighing about 1,080 pounds each, paid a duty of \$11.25, whereas the 3,600 pounds of twine necessary for the working of the machine during eight years paid a duty of \$52.50. But taking into consideration that the manila twine can also be used for other purposes, and that the import of it duty free would be detrimental to the Russian production of twine, especially as trials have been made to produce such twine in Russia from hemp imported from Manila, it was found necessary to limit the duty-free import of said twine to an amount not exceeding 1,080 pounds per machine—i. e., the quantity necessary for the working of the machine during three years.

Further recommendations were made as follows:

Duty on steam locomotives imported together with threshing machines and steam plows, to be lowered to 35 cents per 36 pounds.

Duty on reserve parts of agricultural machinery and implements, imported together with the machines, to be lowered to 35 cents per 36 pounds, when the machines imported have also to pay that duty; but when the machinery imported is duty free, then its reserve parts, coming at the same time, are also to pay no duty.

In order to acquaint landowners and manufacturers with the most recent inventions in that branch of industry, all kinds of new agricultural machinery and implements, imported for experimental stations and museums, to be admitted duty free.

The following products used as manure and for exterminating noxious insects to be imported free of duty: Strassfurt salts, chloride of potassium, sulphate of magnesium, kainite (mixture of chloride of potassium and sulphate of magnesium), saltpeter of Chile, sulphuric acid, copper-arsenic salts, the so-called caterpillar glue and all other apparatus for the purpose of preventing or destroying the diseases of the vine and fruit trees.

The recommendations have been adopted, and the regulations will come into force for locomotives, agricultural machinery, and parts of same, on September 1-13, 1898. For the other articles mentioned above the regulations came into force June 6-18, 1898, and will apply to all machinery, implements and other articles mentioned herein, up to December 18-31, 1903.

## Farm Tools.

THE necessary care of farm tools is greatly neglected by many farmers.

This should not be the case in these enlightened days. Their neglect is the farmer's loss—a tool left in the field when done with till next season is damaged much more than by the ordinary wear and tear of one season's use. It is a common thing, in riding or driving through the country, to see mowers, binders, plows and cultivators standing where last used, and sometimes weeds are grown up around them and almost hide them from view. The owners are therefore frequently found in the Spring of the year at the hardware store and implement dealers' headquarters making bills and notes, and bewailing hard times.

Nothing tends to make a farm more tidy than to see the weeds mown down, where they grow in nooks and corners, and a well-arranged tool shed with the tools nicely cleaned and repaired. Farmers should repair in the Fall, after the rush of work is over, and paint all duplicated parts of wood and repaint old tools when and where needed. This certainly looks better, and the paint preserves the wood and makes it last much longer. Tools should be housed, put in good condition and in good shelter. When it comes time to use them again much worry and vexation will thus have been saved.

—Farm News.

**American Farm Machinery in Rural England.**—How comes it that the American makers have got such a grip on our rural districts with their agricultural machinery? Living a good deal in the rural districts of Derbyshire during the Summer, it is my custom to look at the machinery and implements used on the farms. These usually are quite up to date, for, as a rule, the Derbyshire man is a poor farmer and not at all prone to extravagance in buying new things in machinery. But what they do get appears to be American. During the present hay season this was particularly noticeable. The hay-cutter was American, usually bearing the name of Walter A. Wood, Hoosick Falls, New York. The tedding machine at work in the hay fields was also American, and even the rakes and hay-forks were, in several instances, from across the Atlantic, though forks, rakes and graips are made by various large firms in the city of Sheffield, not half-an-hour's railway journey off.—Sheffield Correspondent of *The British Trade Journal*.

**American Woods.**—The forests of the United States furnish wood for about everything for which wood is needed. We import some fine cabinet and finishing woods, but that is because of a matter of taste and not because handsome cabinet and finishing woods cannot be obtained in this country. No other country has such a complete supply of necessary woods in adequate quantities.

American horseflesh is gaining in popularity both in Europe and Canada. Last year England bought 2,700 more American horses than in 1897, Germany took over 3,000 more, and Canada secured an additional 5,500 of our horses, these sales adding \$1,250,000 more to our statistics of exports of horses, besides some 3,000 head more, worth \$300,000, that were sold to unenumerated European countries.



### German Embargoes.

WE sincerely hope that whatever differences the United States may have with Germany in regard to the commercial difficulties existing between the two countries, such may not become any more vexatious than they are at present. While we earnestly hope for a continuity of peace and friendship with Germany, as it is fortunately established now, according to official statements, it should not be lost sight of that the news of threatened further restrictions against the importation of American meats in Germany, as coupled with the affairs in Manila, are both factors of a dangerous kind.

The United States Government, as well as houses engaged in the business of shipping meats abroad, are well satisfied that Germany can give no good or just reasons for the warfare which that country has maintained against our meat products. The German people—the common people—are the sufferers by these embargoes which are established and carried out under all kinds of frivolous excuses.

A time must come, however, when these excuses cannot be regarded as consistent with international comity, and it is for our Government to say if that period has not been reached. American meat products find their way nowadays to most parts of the world, yet, strange to say, we hear no protest against their character except from those countries of Continental Europe—of which Germany is one—which are dominated by Agrarianism.

We do not desire to see a single kink in the ties that bind the United States in the bonds of friendship and civilization with the other nations of the world, but we hold that in commercial relations, as in all others, there should be absolute fairness. There is no fairness nor honesty in the embargoes which Germany now maintains against American meat products. Our Government is fully alive, we are satisfied, to its responsibility in the solution of this difficulty, and we only wish we could observe an equal disposition to do the right thing displayed at Berlin.—*The National Provisioner*.

### A Sugar-Packing Machine.

SOME time ago we noticed in the pages of THE AMERICAN EXPORTER an automatic coffee-packing machine. The same principle appears to have been applied to sugar but with an important reservation that in this instance the machine is secret. A very fierce war has been going on for a long time in the United States between a prominent coffee-roasting house and the so-called sugar "trust." Each has invaded the field formerly occupied exclusively by the other. The key to the position of coffee firm in the coffee-sugar war is a machine, by means of which they expect to revolutionize the sugar trade just as they have done the coffee trade. A technical description of the machine is hard to obtain, for the reason that the firm fully realizes what an important part it is destined to play in the coming competition, and are guarding it with the greatest care.

With the use of this machine they can introduce the package system into the sugar trade as they did in the coffee trade. The machine weighs out sugar in pounds, half-pounds or any sized package, and does it correctly to the fraction of an ounce. It not only weighs the sugar, but packs it ready for shipment in much less time than it can be done by hand. With this machine the firm will be able to ship the sugar ready for across-the-counter delivery, an advantage that the rivals of the concern may find it difficult to offset.

The grocer who buys sugar packed by this machine will have nothing to do but separate the packages on his shelves and hand them out as needed, without the trouble of weighing the sugar, and without the expense of labor and packing paper.

### The American Agricultural Implement Industry.

THE manufacture of agricultural implements in the United States represents an investment of capital and a development of industrial enterprise that, in comparison with that of other countries, is practically enormous. In the rapid settlement of the country, its large areas of arable land and the rush of immigrants and natives to secure lands, we have some of the causes that have led to the wonderful expansion of the farming implement industry. These have also been among the prompting causes for the ingenuity shown in the construction and efficiency of American husbandry tools. Implements that met requirements under other conditions have been replaced by others that, in economy of time and labor and in swift, effective work, have kept in touch with agricultural needs. The reaper and mower have displaced the scythe and the sickle, and the old-time plow, that leisurely turned its furrow, has given way to the new instrument that can overturn sod or stubble with a Jehu on a spring seat and a gang of

plowshares that leaves half a dozen furrows in its trail. In the binding of sheaves, the threshing of grain, the cultivating and shelling of corn and in the stacking of hay, the modern farmer has appliances and advantages unknown to those who rocked his cradle, or bought his school books and his boots. The preëminence of America in this line of machinery or special tools is acknowledged the world over, and the foreign demand has grown with American prestige. In many lines prices are less by one-half than they were two decades ago, and European competition can be met without loss or risk. The area of trade is constantly broadening. We are following the colonization routes of all nations and are keeping in commercial touch with the agricultural developments of Australia, Egypt, India, China, Japan and Russia. In some of these countries the same causes are operating that have led up to the growth and expansion of our own country. In all American history there has never been the opportunity the present offers or the future it predicates. There can be no diminution, at any rate for years to come, in our foreign trade in this line. We are, in fact, simply on the threshold of a grand opportunity. Conditions were never more propitious, nor was the impetus for agricultural development more strong. Populations that of late years have escaped the decimation of prolonged warfare are increasing. The food supply of nations is now of uppermost concern, and, as the hitherto undeveloped or uncultivated areas of the planet swing into line, the tickling of the earth with a plow to make it smile with a crop is in the highest material interests of the world at large. The world is approaching a crisis time in this matter and America is ready to meet it.

### American Minerals—Last Year's Production Nearly Equal to That of All of Europe.

STATISTICS of the production of minerals and metals in the United States last year show a total value of \$678,966,644 as compared with \$678,767,684 in 1896. The figures were compiled by the *Mining and Engineering Journal*, which is always considerably in advance of Government reports with such returns. The small increase shown is due almost entirely to the lower values prevailing in 1897 for some of the more important items of production. Of the total last year, \$264,538,485 represents the value of the metal produced, the balance being that of the non-metallic substances.

Last year's production is more than twice that of the United Kingdom for the same year, which reached a total value of about \$340,000,000. It is considerably greater than that of all the other European countries combined, the totals for Germany in 1896 having been, in round numbers, \$300,000,000; of France, \$110,000,000, and of Belgium, \$100,000,000.

The most important item in quantity, value and the number of persons employed in producing it was coal, the total output of which in 1897 was 200,257,243 tons, showing an increase of about 12,600,000 tons over 1896. The gain in value, however, was only \$6,250,000, the average value of bituminous coal at the mine last year having been only 81 cents per short ton.

Iron came second in importance with a production of 9,652,680 tons of pig, valued at \$92,677,312, as against 8,623,127 tons in 1896. Last year's output shows a decrease in value of \$1 per ton. Gold was the third product in value, \$59,210,795, against \$52,886,209 in the previous year. The fourth in rank of value was copper, which amounted to 510,190,719 pounds, the greatest quantity ever recorded, and over 30,000,000 pounds more than 1896. The United States now produces over 60 per cent. of the copper supply of the world and exports nearly one-half of its output.

Petroleum was fifth in value of our mineral products, amounting to \$44,804,952. Silver ranked sixth, its commercial value having been \$33,755,815, as against \$39,246,000 in 1896. The production still continues large, having been 56,457,292 Troy ounces, as against 58,488,810 ounces in 1896. Lead was valued at \$11,784,098, showing a very considerable increase, our mines having produced 197,718 tons or 23,000 tons more than 1896. Building stones approximated \$30,000,000 in value and clay products \$60,000,000.

The standard attained by the performance of modern pumping engines is pretty high, as was illustrated by an incident which occurred not long ago here in New York, where some large pumping engines that had recently been set up and were working at rather high speed and almost absolutely without noise were inspected by an expert in such matters who hailed from an interior city. He remarked: "Well, those engines work very nicely now, but wait until you get to pumping water at that speed, and then you will hear something from them probably." His astonishment may perhaps be imagined when it was demonstrated to him that they were at that moment pumping water, and had been continuously doing so for forty-eight hours.



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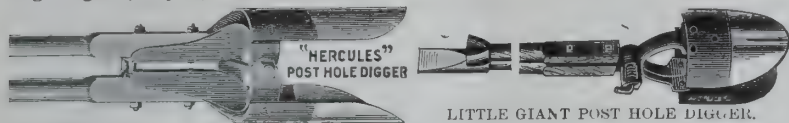
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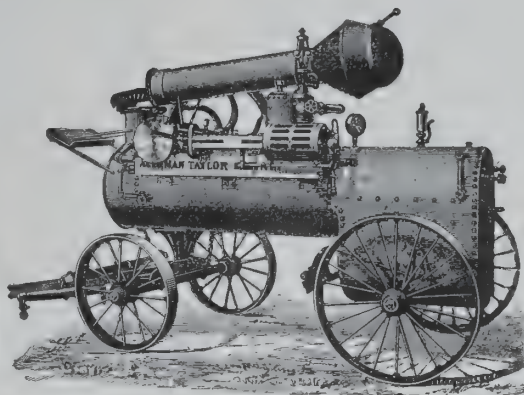
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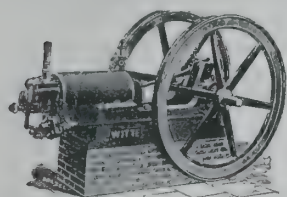
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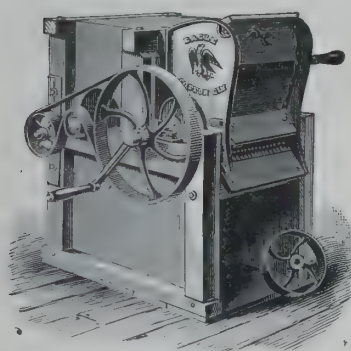


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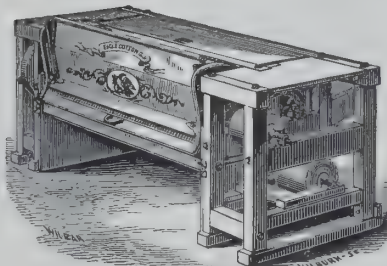
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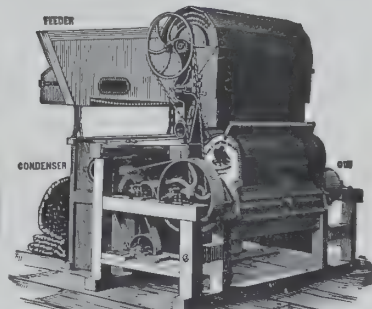
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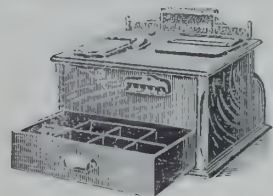
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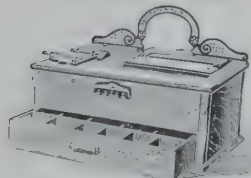
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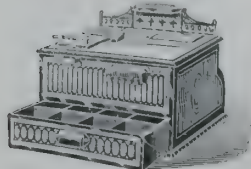
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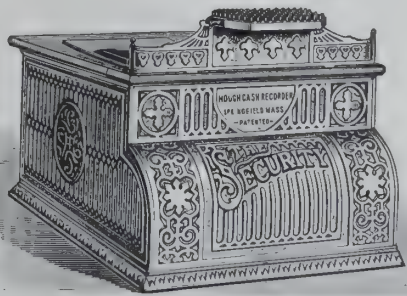


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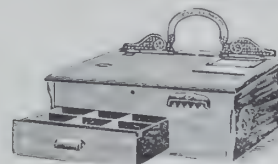
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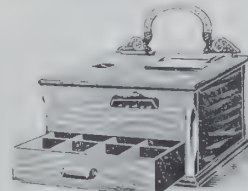


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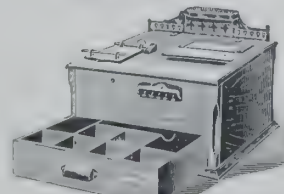
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### Hawaiian Trade.

HAWAIIAN trade is now a matter of direct concern to the United States, as being a part of its own political body. The following table gives the exports and imports of the Hawaiian Islands from 1887 to 1896, inclusive:

Year.	Imports.	Exports.	Total Exports and Imports.
1887.....	\$4,943,840.72	\$9,529,447.33	\$14,473,288.05
1888.....	4,540,887.46	11,707,598.76	16,248,486.22
1889.....	5,438,790.63	13,874,341.40	19,313,132.03
1890.....	6,962,201.13	13,142,829.48	20,105,030.61
1891.....	7,439,481.65	10,258,788.27	17,698,270.92
1892.....	4,684,207.31	8,060,087.21	12,744,294.52
1893.....	5,346,808.58	10,818,158.09	16,164,966.67
1894.....	5,713,181.43	9,140,794.56	14,853,975.99
1895.....	5,714,017.54	8,474,138.15	14,188,155.69
1896.....	7,161,561.40	15,515,230.13	22,679,781.53
Total....	\$57,947,978.85	\$110,521,413.38	\$168,469,392.23

In this trade the United States has had a large share, an increase of trade dating from 1876, when the reciprocity treaty went into operation. This increase has been marked both in imports and exports. The imports of the Hawaiian Islands since 1876 made a total of \$100,000,000, and of this sum not less than \$70,000,000 fell to the share of the United States. Exports from the Islands from the year named represent some \$200,000,000, and of these the United States absorbed \$180,000,000. These figures are in evidence of the close commercial relationship of the two countries, and broadly indicate what the future may yet develop, now the twain have become one. The leading exports of the Islands include sugar, rice, bananas, coffee, wool, hides, pineapples, molasses, and goat and sheep skins. It is probable that with the political question now settled, and the infusion of new blood and energy that is sure to follow, new avenues of enterprise will be opened industrial interests developed, and that the export trade of the country will keep in ratio with its progress. Its imports at present cover a wide range of goods, including machinery, cotton goods, hardware, agricultural implements, lumber, flour, building materials, etc. Statistics show that in the year 1876 the United States represented in this trade \$5,464,000; Great Britain, \$785,000; China, \$299,000; Japan, \$276,000; Germany, \$148,000; Australia, \$114,000. The imports of iron and steel and manufactures of the same from the United States from 1887 to 1896 inclusive are thus tabled by the Bureau of Statistics:

#### Iron and steel and manufactures of

1887.....	\$405,332
1888.....	265,564
1889.....	352,552
1890.....	765,126
1891.....	762,896
1892.....	473,616
1893.....	214,844
1894.....	405,316
1895.....	545,614
1896.....	726,942

These figures will no doubt show a large increase in the course of the next few years, when industrial plants will be multiplied, population largely increased, and the demands for machinery, tools, mechanical appliances and increased railway facilities will keep pace with improving conditions both of trade and the people.

### Car Painting by Compressed Air.

THE following is a topical discussion of "The Durability of Paint Applied to Freight Cars by Compressed Air," as compared with paint applied with the brush, recently presented at a railway convention:

We paint about 400 cars a week with compressed air and are positive that we are getting better results, a saving in labor, and our cars are painted more thoroughly than with a brush. We have cars that have been painted about two years, and in order to get reliable information for the benefit of this association I sent out inquiry letters all over our system to have our foremen painters inspect any cars that they could find that were painted with air. We found most of the old-school painters opposed to the air system when we inaugurated it. Our painters report as follows:

"After making close observation of several cars done by air and by brush I find very little difference in them, and, if any, it is in favor of cars done with air."

"Cars painted by air look equally as well and show no more sign of giving way than those done by brush; therefore think air best on account of cheapness in applying."

Our master mechanic at Water Valley says that on examination of cars painted with air within the past two years: "I find the surface of the cars in better condition than cars painted with brush. The reason for this I attribute to the fact that the spraying of the paint with air fills the cracks of the wood and between the joints of siding better than the brush will do, as men are apt to be careless with the brush in painting and overlook joints in beading."

Another says: "The process is of much value in the expeditious and economical covering of that class of equipment. The driving of the pigment against a surface of lumber by air pressure is an advantage in the fact that all portions are covered, beading, cracks or any such openings, due to the weave of a car in normal condition. My inspection of cars painted by air process has led me to believe that in point of durability the hand process is largely discounted."

The following letter from our painter in Chicago shows his opinion and inspection of cars in the West: "After inspecting work that had been painted six months I felt pretty well satisfied that we need have no fear from the results from this method of painting, and now, after inspecting work that has been out nearly two years, I feel perfectly satisfied that work done by compressed air surely will wear as well if not better than brush work. There is one particular advantage that paint applied by air has over brush work, and that is that it reaches every possible opening, being driven into the open grain of the wood farther, into all cracks, beads and many places where it is impossible to get with the brush, thereby more effectually sealing the wood, iron or whatever you may be painting, to all exposure. Air-applied paint in time becomes very hard, and although it becomes hard it does not get brittle, but seems to retain its life, and does not seem to chalk and perish like ordinary brush-applied oil paint."

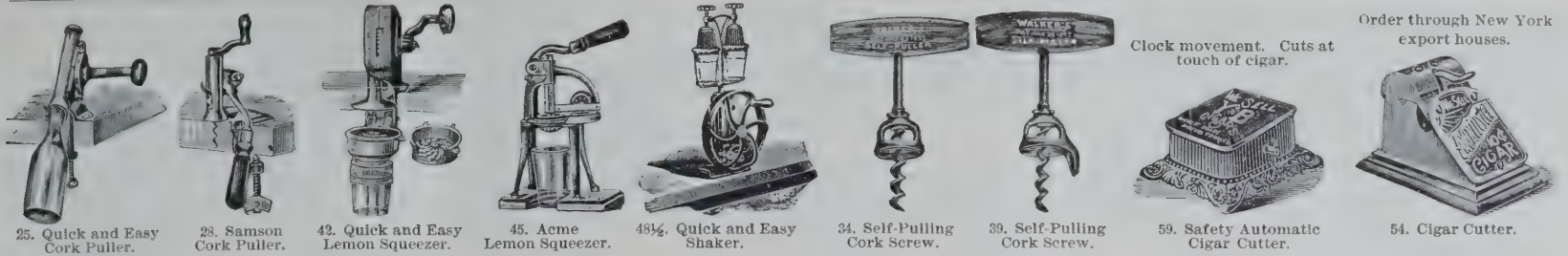
In conclusion, I wish to state that I have personally investigated hundreds of cars done by compressed air, and I feel safe in saying that we got far better results from air as far as wearing qualities are concerned. I think that air is desirable from the fact that we get our cars painted with a great saving in labor.—F. W. Brazier, Assistant-Superintendent of Machinery, Illinois Central.

### Strikes in Great Britain.

MR. RHODES gave the order for rails for the Buluwayo railway to Germans because Germans could run the risk of taking contracts without a strike clause. The order for the Siberian railway is going to America for the same reason. Nobody who wants to get his work done in a hurry can employ Englishmen, and hurry is rather the rule than the exception in the modern world. The phenomenon is all the more extraordinary when one considers that the British workingmen are in things political the sanest, the least liable to be carried away by sudden impulse or revolutionary excitement. Germany has social democrats, France has had the Commune, America has had Chicago riots and a wave of Bryanism. Great Britain merely wavers between moderate Liberalism and opportunist Toryism. The British workingman has gained the reputation, whether as a voter or an individual, of being the most sober and steady-going to be found anywhere. The British employer prides himself likewise on the national spirit of compromise. Yet while our strikes may be the most orderly, they are also the biggest and the most frequent. The actual loss through stoppage of works, or from the uncertainty which prevents us getting orders, is greater in England than in any other country.—*The Speaker*.

**American Farm Machinery in Favor in Russia.**—The United States annually sends to Russia from one and a half to two shiploads of harvesting machinery; corn shellers, hay forks and various small wares of American make are in good demand, but American plows are not in high favor, nor can they compete with German plows. These latter are made by hand and sold by the pound; they come in different styles and are more attractive to the Russian than American plows. It is only very recently that American plows have been able to obtain any foothold in Russia at all, and their use is increasing, although not very rapidly. American harrows are gradually displacing the Russian's crude, old-style harrow. American manufacturers of agricultural implements generally experience but little competition in Russia, except in the line of plows. A few machines of Roumanian or English make are seen on the Russian market.





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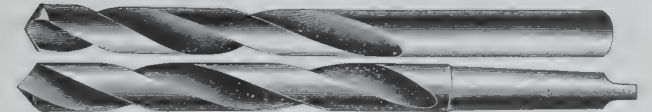
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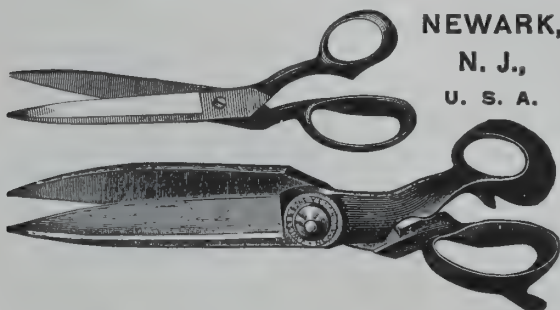
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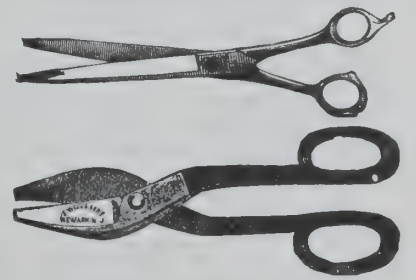
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**FRAME.**—Best quality of weldless steel tubing is used. Main frame, 1½-inch; head, 1½-inch; lower rear stays, ½-inch, D shape, tapered to ¼-inch; upper rear stays, ¼-inch.

**FRAME CONNECTIONS.**—Flush joints.

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**HANDLE BARS.**—Steel adjustable.

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**HUBS AND CRANK-HANGER.**—Barrel pattern.

**WHEEL BASE,** 43½ inches.

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**CRANKS AND SHAFT.**—Two-piece, joined in center.

**FINISH.**—Black, maroon or green, plain or striped and decorated.

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**CHAINS.**—Superior make, “B” block pattern, centers and pins hardened.

We also make **HIGH-GRADE TANDEM**s and **JUVENILE WHEEL**s.



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are known the world over for their excellent finish and reliable quality. Write for export prices. We deliver our machines properly boxed, freight prepaid, to New York City.



Tribune Model 33. Price, \$50.00.

Model 33 is a bicycle of excellent quality and finish, and far superior to many machines listing at higher price. The frame is weldless steel tubing of best quality, built in two heights, 23 and 25 inches; wheels, 28 inches diameter; gear, 73; cranks, 7 inches. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, gold striped, nickel trimming. Weight, about 23½ lbs.

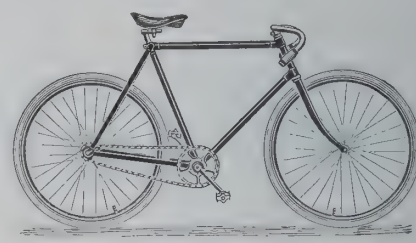
**ARENA MODEL M.** Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 34. Price, \$50.00.

Model 34 is practically the same as Model 33, excepting that it is built with drop frame, 20½ or 22½ inches, for ladies' use. Weight, about 24½ lbs.

**ARENA MODEL L** is very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.

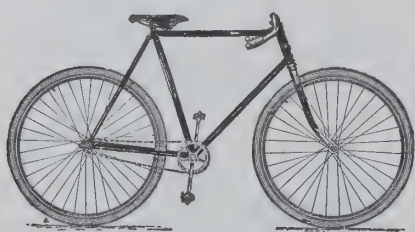


Tribune Model 350. Price, \$75.00.

Model 350 is built for road racing and for all purposes where a light wheel is desired. The frame is built in 23-inch height only. Drop to hanger, 2½ inches; 7-inch cranks; Tribune special single-tube racing tires. Weight, about 21 lbs. Finish, black, gold striped.

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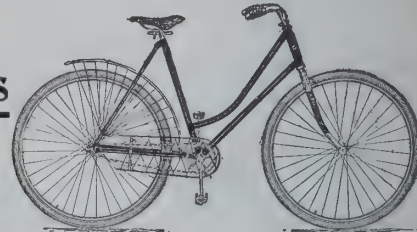
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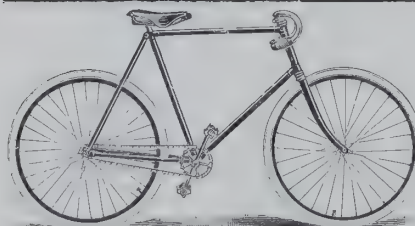
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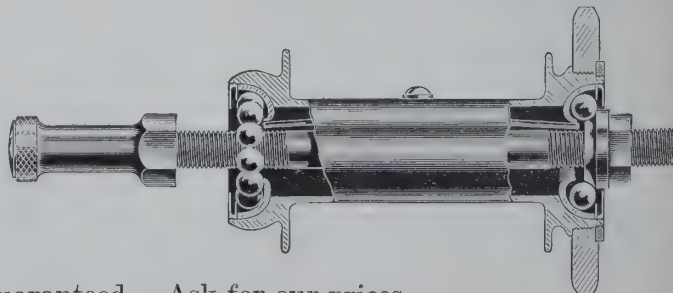
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### A Revolution in the Tire Manufacture.

FOR some three years past it has been an open secret that a well-known inventor of some most ingenious rubber machinery was devoting his attention exclusively to the pneumatic-tire problem. With what success no one knew until a few months ago, when news was received that the English, German, French and Belgian patents for certain tire machines, invented by this gentleman, had been sold for a large sum in cash.

The problems that have been solved by this machinery are three, and all have to do with the molding and curing of the tire and inner tube, and for these purposes there are three automatic molding-presses. The first machine, which is a mold and a press combined, is used wholly for molding and curing single-tube tires. It consists of a steam-press, occupying a floor space about four feet square. Into this runs a hinged mold that not only holds the tire, but that by an automatic arrangement lets live steam into its interior, inflating it so that it is beautifully molded and is cured with a quickness that is marvellous. The press in its simplest form is neither a screw nor a hydraulic press, the two platens being brought close together by a short lever that a child could operate. *Four minutes* only in this press cures a high-grade tire perfectly. The release of the lever opens the press, slides the mold out on its track, releases the pressure of steam on the inside of the tire, opens the mold and shows a fully finished tire, perfect in every particular. Ten seconds later another tire is in place and in process of curing. So quick a cure would perhaps run against the idea of some manufacturers, but tires made by this process have been so thoroughly tested that there is no question but what their quality is equal to any, no matter how slow the cure. One of these machines will easily turn out 120 tires a day, and one man can run five machines. As these machines are furnished on a small royalty, it would seem that the hundreds of molds usually needed in a tire outfit will no longer be necessary. Several large American concerns have already equipped themselves with these machines, and to-day one hundred thousand sets of tires made in them are in use. One set of tires as a test was run 21,000 miles and then were apparently as useful as ever. It is well to add here that a cheap compound will cure equally well and in even less time, in some cases as quickly as two and a half minutes.

A second machine which worked just as smoothly, but is rather more intricate, is a hydraulic collapsible-head mold and press. In this any kind of detachable tire can be made in from three to five minutes. A perfect Dunlop tire was turned out in four minutes' time, while the visitor held the watch. This tire was made up with wires in the fabric, a strip of rubber on the outside, but with no sewing, and was shaped, molded and cured perfectly in the time mentioned. Tires thus molded have been carefully tested and have been found to be equally as strong as those made in the English fashion, where the fabric does not come near the heat.

A third machine that is equally ingenious and effective is a molding-press for the manufacture of inner tubes. This turns out twenty complete inner tubes at a time, with the valve stems all in place, and is easily operated by two boys.

### Distrust the \$2 Tire.

THERE is a pronounced demand in certain quarters for cheap tires, but the close buyer shrinks even from examination of the \$2 article. And well he may, for, although it is made to counterfeit the appearance of a first-class tire, yet it is without any of the characteristics which chiefly distinguish goods with merit. It is smooth on the tread, corrugated or pebbled; it is soft to the touch, has the appearance of being well made, and by those who are exhorting cycle-makers to fit it to their machines is highly praised for its resiliency. It weighs no more than other tires. It looks as good as any.

But put this cheap tire in a vulcanizer and proceed to make a repair. Its walls will crack, for they are thin. Then one by one its blemishes and imperfections will come into full view.

Of course, no guarantee is given with the \$2 tire. It will hold air until it is put on the rim. It will retain its fine appearance until the oxygen in the atmosphere begins to prey upon its beauty and decompose its rubber, which, by the way, is usually a low grade of African stock and far inferior to Central American or Pará rubber.

Some knowledge of the commercial value of the various brands of rubber may be obtained by taking note of the shrinkage which occurs in them while in the crude condition. Pará rubber will lose about 22 per cent. in washing, drying and breaking down. Central Americans will lose 35 per cent., while Africans will lose 30 to 50 per cent. The greatest loss of the rubber, however, does not result from shrinkage, but through imperfect methods of manufacture, of which vulcanizing is attended with the greatest hazard. Goods which are apparently perfect prior to vulcanization, and are worth in the neighborhood of \$1.50 a pound, labor included, will often come out of the vulcanizing molds worth no more than two cents a pound as scrap. In the case of tires which have been imperfectly manufactured they are worth no more than five cents per pound. It is related of one tire-manufacturing establishment in the East that in the last two years fifty tons of scrap rubber have been sold as the result of faulty manufacture, while a Western concern, despite its extreme caution, spoiled fifteen tons weight of tires in the past season.

With these risks of tire-manufacture known—with vulcanizing molds selling for \$100 apiece or thereabouts—with good rubber stock quoted close on to \$1 in the market, with marketing expenses, investment in plant, and a hundred other charges yet to be taken into consideration, it is hard to understand how tires can be honestly made and profitably sold at \$2 a pair.

**Aluminum for Horseshoes and Bicycles.**—The United States commercial agent at Roubaix, Mr. Atwell, writes under date of June 7, 1898: "Aluminum is now being used in the manufacture of bicycles, and military authorities have for some time past made an effort to employ this metal in place of iron, copper and steel for all articles of equipment carried by infantry, in order to reduce the weight as much as possible. With the same object, the Russian Minister of War has ordered aluminum horseshoes for the cavalry. The first trial is now being made by the Finland dragoons, and the horses are shod as follows: A shoe of the new aluminum model is placed on one foot, the three remaining shoes being of the kind now in use. The trial, which has already lasted six weeks, seems to be satisfactory, as the aluminum wears out less rapidly and is less affected by mud and moisture than the ordinary shoe. The difference in weight is about 70 grams (2½ ounces) on each shoe. The cost is not greater at present, and will be less as soon as the system of manufacturing the new shoes shall have been perfected."

**The War Stimulates American Trade.**—The country has awakened to a sense of its commercial strength and resources. There has been a realization of its strength and a quickening of enterprise which springs naturally from such consciousness. The signs of national good health and vigor abound, and these manifestations, more than any other element, point to an increasingly brilliant industrial future. The war has increased the standing and influence of this country in the eyes of other nations, and it will inevitably result in opening new fields of trade and commercial conquest. The time was ripe for the inauguration of a new era in the commercial history of the United States, and the war, if it serves no other purpose, will serve to set the new energies in motion.

**New Use for a Bicycle.**—A confectioner in Manchester, England, has discovered a very novel use for the bicycle. This is nothing more than converting his machine into an ice-cream freezer. The bicycle, which is, of course, stationary, is mounted by a boy, who instantly pedals away for all he is worth. The chain is connected with the freezer, and thus causes it to turn very quickly. In this manner he can freeze a 17-gallon tin of ice cream in twenty minutes. There is no difficulty in getting the boy to work. He enjoys and thrives upon it, and seems delighted to think that he can scorch—or should it not be freeze?—away to his heart's content without any fear of incurring the displeasure of an enterprising policeman.

Possibly a contributory cause for the Hooley failure may be found to exist in our exports of bicycles, which last year aggregated \$6,846,529 in value. Of this amount \$1,852,166 went to the United Kingdom, and there can be no doubt that of the other \$5,000,000 worth sent to all parts of the world a portion at least tended to check the sale of British bicycles.



### Steel Temper for Cycle Parts.

WHILE perfection in the handling and tempering of steel is not yet in sight any more than in other matters mechanical, the advance in the art has been very great during the past few years. This is nowhere better illustrated than in the experience of riders with the cranks used on the bicycles of to-day.

It does not require a particularly long memory to recall the frequency with which cranks broke about half a dozen years ago, when the process of cutting down weight wherever possible was in operation. Even the heavier cranks of times preceding those were not proof against these breakages. One has but to compare one of the cranks used on the ordinaries with those of the present day to be aware of their great disparity in weight, yet even the latter were not exempt from this weakness.

When one and two piece cranks first came into use in the evolution process of the bicycle, one of the chief arguments used against them was the expense that would be incurred in case one of the cranks should break. In such case, it was argued, it would be necessary to replace both cranks and the shaft, while if the old method of construction were adhered to, all that would be required would be the purchase of one crank to take the place of the broken one. This argument had considerable weight for a while with many prospective buyers, as its force was derived from the frequent cases of breakage that were apparent wherever the rider went. Such an occurrence was naturally annoying, but it did not necessarily stamp the machine as worthless. It should not have occurred, of course, but it was not deemed possible, even with the best machines, to guard against such breakages absolutely.

Quite a different state of affairs prevails at present. It is within the power of any maker to purchase or have made for him cranks that will not break. Drop-forge makers are to be found who will furnish cranks that can almost be guaranteed against breakage. One-tenth of one per cent. is accounted a large percentage by some makers, while there are not wanting others who claim an entire immunity from such breakages as can be charged to any fault of the crank. Such a showing is wonderful, but riders of good machines have become so accustomed to this state of perfection that they give it no thought or commendation.

The improvement is due to the use of better steel and to better methods of tempering. There are some kinds of steel that will stand all right if given the proper degree of temper, yet if this is omitted, they will break almost as fast as they are used. This was well illustrated by the experience of a factory that had been using a crank that required no further tempering than that given it when forged. It gave entire satisfaction, and should have been adhered to, but for some office reason an order was placed with another mill for a different style of crank. This was finished up and put out without tempering similarly to the method employed by the first one. The result was trouble almost from the start. Breakages began to occur, and kept up almost as fast as the new cranks were put out.

Complaint was made to the drop-forge makers, who were unable to assign any reason for the trouble other than the belief that the cranks were not being properly tempered. A toolmaker was sent from the factory to the mill for instruction in the method of tempering advised by the forgers. Upon his return he began to temper the cranks as he had been instructed, and the trouble disappeared entirely. A private mark was put on the cranks that were tempered, and not one of them ever broke.

The lesson is a valuable one, but unfortunately, it needs the actual test of experience to give it point. Many a bicycle factory has sunk dollars upon dollars in useless experiments in the handling of steels, tools and kindred articles, when a little careful inquiry and solicitation would have proven an immediate preventive. The manufacturer who is unwilling or too careless to profit by the experience of others usually learns the lesson by dint of hard knocks and expensive outlays of cash and experience.

### No Change in French Bicycle Tariff.

THE secretary of the American Chamber of Commerce in Paris has informed our exporters that the French Parliament probably will not, during the present session, vote the increased duty on American bicycles which has been proposed, since there is scarcely time at present for the consideration of this question. The secretary writes: "American wheels are so much lighter, stronger, neater and better than native makers find that the imported goods are taking all the trade. It is very doubtful whether the French Government will raise the tariff to the extent indicated, because they make a nice revenue from the tax on cycles, and the trade would undoubtedly

suffer if American wheels were shut out. In 1896 the Government realized the handsome sum of \$551,000 from the tax on cycles, or \$1.93 per wheel annually. There were 203,000 bicycles in France in 1894, 256,000 in 1895 and 329,000 in 1896. If your makers," the writer from Paris says, "could send a cheaper line of machines into the market they could make a lot of money. It would pay an American house to establish a general agency in Marseilles and all the leading centres for the sale of their cycles. The present duty on bicycles in France is \$5 per cycle, whereas the increased duty which the French manufacturers want would be about \$12."

### Quick Journeys Made Now.

A FRENCH statistician has just drawn up an interesting document showing at various periods in what time certain frontier towns could be reached from Paris. The years chosen are 1650, 1782, 1834, 1854 and 1897. In 1650 it took five days to go from Paris to Calais. One hundred and thirty-two years later, in 1782, the duration of the journey had been reduced to sixty hours. In 1834 it had fallen to twenty-eight hours, and in 1854 to six hours forty minutes. To-day one of the boat expresses takes three hours forty-two minutes. The journey to Strasburg took two hundred and eighteen hours in 1650, one hundred and eight hours in 1782, ten hours forty minutes in 1854, and to-day a matter of eight hours twenty minutes.

The difference between Marseilles is still more phenomenal. From fifteen days in 1650, the duration of the journey was reduced to eighty hours in 1834, and to-day it takes twelve and one-half hours. The distance from Paris to Bayonne two centuries ago took three hundred and eighty-eight hours; to-day it occupies eleven hours eleven minutes. Brest can be reached in thirteen hours thirty-seven minutes, while in 1650 it took two hundred and seventy hours. Finally, for Havre, ninety-seven hours was considered quick traveling in 1650. It took fifteen hours in 1782 and seventeen hours in 1834. To-day it is a matter of three hours fifteen minutes.

### Too Poor to Be Economical.

SEVERAL leading Americans who have been seeking to place contracts in this country, says the *English Iron and Coal Trades Review*, both for labor-saving machines and for other American notions of merit, have informed me that they are surprised to find how generally the complaint is made that our manufacturers are too poor to be able to afford the luxury of more economical methods and appliances. In a number of instances this is known to be the case, but it seems to be more largely the fact than most people anticipated. And yet it is not so surprising after all. The majority of the large concerns engaged in the iron and steel industries of this country are limited liability companies, and it rarely happens that limited companies are allowed by their shareholders to provide as large a reserve as they ought to in order to meet all emergencies. In many cases almost the last sixpence has been paid out in dividends, and repairs and renewals are inadequately provided for. In some industries this might not be a matter of much concern. In the iron and steel industries it counts for a great deal. The truth is that, as history has been lately made in these industries, it has almost been necessary to completely reconstruct mills, forges, and other plant, every ten years, so that any plant kept in use for a longer period has become more or less antiquated. Our American friends appear to have realized this condition more fully than ourselves, and when they find that a plant is no longer up-to-date they make no fuss about removing and replacing it. It is their readiness in this respect that has brought them to the front; it is our backwardness in the same essential that has left us in many cases lagging behind.

**Minor Foreign Tariff Changes.**—A modification of the customs tariff of Norway went into effect on the 1st inst., and among the most important alterations are those applicable to machinery. Under the modified law motors for steam, water, wind, gas, petroleum, benzine and electricity, dynamos and parts of same will pay 5 per cent. minimum and 10 per cent. maximum. Other machinery, including locomotives, steam fire engines, steam winches, donkey engines, etc., for industrial purposes, technical and agricultural purposes, and for ships' use, also parts of the same, machine packing, cables, straps, sewed belts, etc., all not specifically provided for, minimum duty, free; maximum duty, 10 per cent. The Russian Government has granted a ten-year exemption from duty to foreign machines or parts of same to be used in gold washing in the Siberian and Ural gold fields.



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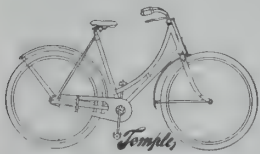
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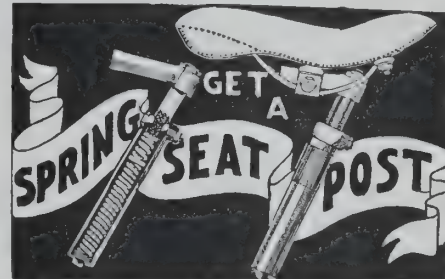
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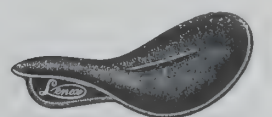
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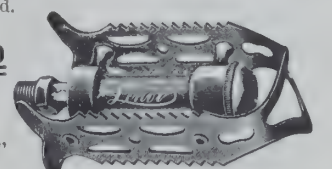
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### Machine vs. Hand Work.

IN the working of metals—the fashioning of them to useful purposes—the great advantages of modern machinery as modernly employed have worked wonderfully to the advantage of humanity. We, as a whole, find ourselves in possession of a thousand things to-day that have become almost necessities that we should not have but for the fact that machinery has put them in our hands, for all of which it should receive due credit. But we have become so accustomed to singing its praises that we endow it with an assumed superiority that it does not possess. It is assumed, which is literally true, that an almost infinitely greater amount of work—useful work—can be done by the use of the machinery of to-day than by the machinery of fifty years ago, and it is also assumed that by no process of hand work can the work of the machine be equaled, which is all wrong. Those who look casually at the matter, and from many of whom we should expect a better analysis, even go so far as to predict that there is but little further use for skilled mechanics. A laudation of machinery that goes so far as this is calculated to do harm. In point of fact, the machine is very far from being superior to the machinist, and the best work it can do can be improved by intelligent hand work. Instead of improved machinery requiring less skill, on the part of the skilled mechanic, greater skill is required of him.

In regard to the employment of hand work to improve machine work, one of the most common examples is the ordinary surface plate used by machinists. A surface plate is simply a flat surface, which would seem to be about the easiest thing in the world to be produced by machinery. Now the machine is not in existence by the use of which a surface plate of any value whatsoever can be produced. Such a plate as it comes from the machine is literally good for nothing until it has received the hand work of the machinist. For him to do what the machine cannot do is a very simple matter. It would hardly require the services of a very highly skilled mechanic. The finest of mathematical and other instruments require the work of the hand to complete what the machine has roughed out.

It is a mischievous mistake to assume that the advent of machinery of the most delicate character calls for less skill on the part of the skilled mechanic. The reverse of this is exactly true. It means simply that a good deal of work that was formerly done by the skilled mechanic has now become, by the aid of modern machinery, work for the man without any skill worth speaking about. But the eye and the hand of the skilled mechanic are as much superior to the machine as the machine itself is to the rough ore. There is not a single machine process that cannot be improved by the eye and the hand, and this will always be true. There always was and always will be room enough at the front for the skilled mechanic.—*The Tradesman.*

### Demand for American Machinery.

THERE is a restless disposition among American manufacturers to supply not only the growing home demand for machinery and tools, but that also of foreign countries. The impulse of foreign manufacturers seems to be to grasp American ideas in mechanical equipment in order to forestall the inroads being made upon their home trade by our advanced methods in industrial economy. The inventions of Great Britain have become old, and industrial advancement there seems dependent upon American ingenuity for devices to lighten labor and strengthen the capacity of the workshop. The new inventions that have been perfected in this country during the past few years are fully a half century in advance of English systems, and the manufacturer of that country who is willing to plod along with old and intricate processes is finding he can no longer compete successfully with aggressive competitors that have adopted modern methods. As a consequence of the adoption of American machinery by many of the more alert English and German manufacturers a few years ago, the reputation of our tools has spread not only throughout these two great empires, but also into France and Russia. As soon as a valuable tool is introduced upon the American market it at once becomes an item of interest in the trade of these countries. The reputation and superiority of American inventions have as well gone into Mexico, South America, Japan, Australia, Asia and Africa, comparatively new fields in industrial awakening, but extensive empires well supplied with inexhaustible resources and unlimited raw material for future development. And what our exporters have thus far accomplished is only the beginning of a movement to compete with the markets of the world.

The influence of American genius has become so powerful that English engineers, in laying out plans for equipping a new plant, come straightway to the United States for ideas before proceeding with their operations, and take back with them American-made engines, pumps, lathes, planers and

minor automatic machine tools. Besides this they are adopting our locomotives and electric-light systems, and sooner or later will be taking designs in railway coaches and other stock. The great municipal pumping systems at St. Petersburg, Rotterdam and Bombay, monuments to American ingenuity and skill, are operated by American machinery; and the principal railroads there are also a blazing index to American progress and industry. In France our electrical machinery is appreciated as being so much more valuable than French products that native manufacturers are unable to secure orders let right before their own doors, and this is true as regards competition in furnishing rolling stock and steel rails to South America, Japan and other trans-Pacific markets. The leading manufacturers in this country have gone into foreign markets very quietly, and the surprising volume of foreign business can be arrived at only by a careful examination of our statistics of export trade.

It is an easy matter to look around and discern those among our manufacturers who are in the lead in grasping the vast opportunities offered in foreign markets for machinery and hardware goods. With most friendly relations with all the leading nations, our manufacturers who are the most aggressive at home are the most progressive in seeking foreign business and meeting the demands of foreign purchasers. The successful ones are those who have studied carefully the peculiar needs of the consumer, as well as the best methods of shipment, furnishing well-made goods on satisfactory terms of credit and guarantees of durability. On this basis export demand is expected to increase in connection with our home trade and render permanent prosperity to our industries.

### The Merits of Automatic Stokers for Large Manufacturing Establishments.

THE fallacy of the general notion that a clear stack signifies economy, and that a smoky stack means wastefulness is being appreciated more and more. The principal loss from the incomplete combustion of gases is not indicated by the appearance of the chimney mouth, but is due to the escape of invisible gases, and the visible smoke formation is a rather insignificant item of loss.

Smoke prevention is rather to be regarded as a measure of public hygiene and cleanliness than as a problem in the economical generation of steam, but in all large cities the former conditions should rule even at the expense of economy. Neglecting, then, the question of the value of smoke prevention as a measure of economy, automatic stokers may be considered upon their merits, merely as substitutes for hand firing; and in very many instances remarkably good showings have been made. As one of the speakers said: "All stokers are good, but some are better than others." The constant and uniform feeding of the fuel is undoubtedly conducive to thorough combustion, and with the travelling grates used in many forms of apparatus, a clean fire is assured. One source of economy resulting from mechanical firing is the greater length of life of boilers when freed from sudden changes of temperature.

So long as coal continues to be burned directly under the boilers which are to receive the heat, there is little doubt that mechanical stoking offers material advantages over hand firing. It seems, however, to be but a partial solution of the problem, and some day, perhaps, we may wonder why the barbarous practice of burning fuel within city limits and discharging the products of combustion directly into the atmosphere was ever permitted.

In the words of a review of this subject, written several years ago: "The use of gas producers and the methods of using producer gas are surely well enough known to bear wider application than has yet been given, and the present practice of firing each boiler independently is not much less primitive than would be the use of separate gas retorts for the production of illuminating gas for each establishment. The introduction of electrical methods of distribution of power would make it altogether possible to have power-generating plants placed entirely outside the limits of our large cities, and enable vast batteries of boilers to be fired with smokeless gas generated from the lowest grades of coal in independent producers; while the power developed in engines of highest efficiency, and transmitted and subdivided by electricity, might almost rival in cheapness that obtained from Niagara."

**The Philippines Rich in Woods.**—The Philippine islands are rich in woods, mostly unknown to the rest of the world. There are said to be thirty-two tinctorial or coloring woods, which give the entire series of colors or shades. Ebony, of very fine grain abounds. The magkano of Mindanao is said to be absolutely immune from rot.



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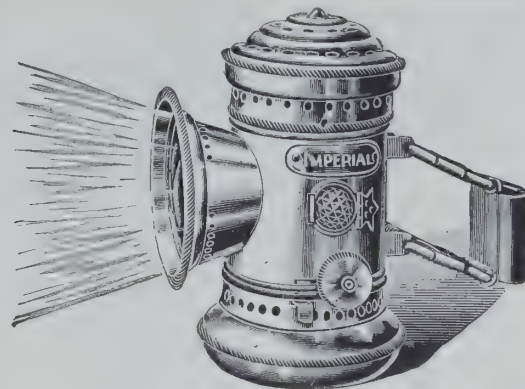
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They are strong, safe, clean, attractive.  
They produce a large, bright light. Are fitted with fine magnifying lense.  
They are made from the very best material and possess positive merit.

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is the most pleasing design in Spoons and Forks yet produced. The wearing qualities of the Spoon are unsurpassed. Send order for

Combination No. 53, consisting of

6 doz. Unique Tea Spoons, XIV Plate, Extra Sectional.  
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6 doz. Unique Round End Medium Knives, 12 dwt.



TEA SPOON.  
Full Size.

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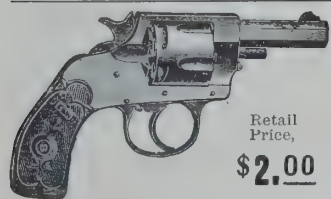
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The following articles for table use are made in the UNIQUE pattern:

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Dessert and  
Table Forks,  
Coffee Spoons,  
Fruit Forks,  
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Retail Price,  
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Manufacturers of High-Grade

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At Moderate Prices, for Export.

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and Wire Goods of every description.

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used in all Bicycle Stores, Public Buildings, Business Offices, Factories, Stores, Depots, Schools, Churches, Private Dwellings, Etc. Catalogue "S" on application.

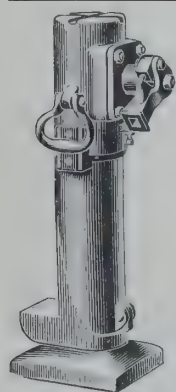
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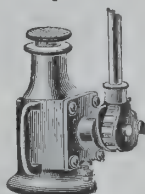


They Adjust to any angle, but when set are firm.

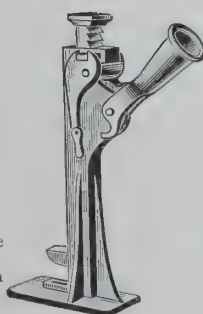


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HAVE NO EQUAL FOR RAILWAY OR OTHER HEAVY WORK.



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**No More Rust.** Our "Three in One" Lubricant Contains no Acid. Prevents Rust on All Metals.

The only perfect Lubricant for Bicycles, Guns, Sewing Machines, Reels, Etc. Never gums or hardens. For cleaning Bicycles or Fire Arms after shooting. It has no equal. It is transparent and clean to use. Correspondence solicited. Send for Catalogue "C." Order through Export Commission Houses in this country. Manufactured by

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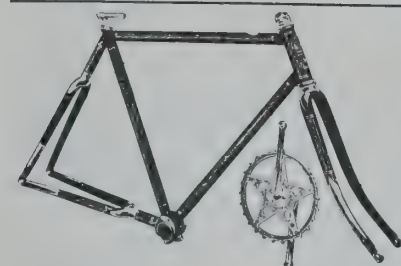


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ARE THE BEST IN THE WORLD.

Made in all sizes and styles. (32 numbers.) Send for Catalogue "B."

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"THE FINEST ON EARTH."

That's a broad claim to make for anything, but in the case of the

**MANSON 3 CROWN**

MODEL 33

it's but the simple truth, and there is no need to deviate from the truth.

The Several Reasons Why?

It is made of the very best material.  
It is new and novel and eminently practical.  
It has two rear crowns to match the front fork crown, causing the machine to be absolutely rigid.  
It has an eccentric bracket at the hanger which facilitates the adjustment of the chain without using the rear chain adjusters, and is fitted with the one-piece Fauber crank.

The Thor Hubs are used and recognized everywhere to be the best.  
The best swaged spokes, 14x16 size, are used.  
Laminated or one-piece selected rock-elm rims, 1 1/4 or 1 3/4, 28-inch wheels, drilled 32x30.  
The Peacock or Baldwin adjustable chain.  
Head set, turned from bar steel, drop forging connections.  
Seamless tubing throughout.

Dunlap tires.  
Steel adjustable handle bars.  
Christy saddles.  
Record pedals.  
Finest nickeling and enameling that can be put on a bicycle.  
Frames, 22 and 24 in. high. Weight complete, 24 lbs. Choice of gear.  
Ladies' frames are made same as gents, with exceptions of drop bar and chain guards. Height, 20 and 22 inches.

THE PRICES—\$75 less 33 1/3 and 5 per cent., delivered f. o. b. New York.  
**MANSON CYCLE CO.,** 73-75 West Jackson St., Cable Address: "Manson," Chicago, Ill., U.S.A.

## The Universal Multi-Nebular Vaporizer

FOR OFFICE USE

IN THE TREATMENT OF ALL DISEASES OF THE

**RESPIRATORY ORGANS AND MIDDLE EAR**

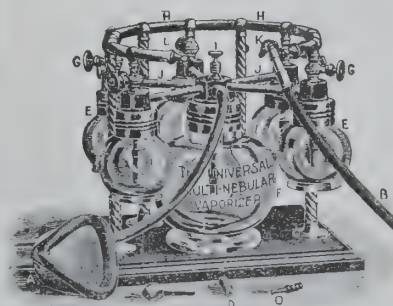
by Ten Different Methods, including

**VAPO-PULMONARY MASSAGE and VAPO-AURAL MASSAGE.**

IS INDISPENSABLE IN OFFICE PRACTICE.

Write for circular describing the instrument and methods of use.

**GLOBE MFG. CO., Battle Creek, Mich., U. S. A.**







News of Notable Export Contracts, Sales and Shipments.

A somewhat novel order, to American mills, so far as time of delivery is concerned, is that of a Mexican road, which is in the market for 24,000 tons of steel rails to be delivered over a period of three years at Vera Cruz. American mills usually do not consider business extending delivery over more than one year. Chicago has taken an order for 4,000 tons of rails for Japan.—*Iron Age*

An unusually large order for electrical apparatus was received recently by the Walker Company, of Cleveland, O. The order came from the Exploitation des Procédés Electriques Walker, the Paris agency of the Walker Company, and was for 500 complete street railway equipments, comprising 1,000 25-horse-power motors, 1,000 controllers and 500 trolleys. The apparatus will be the standard make of the Walker Company and will be distributed through cities in Italy, France and Germany. An officer of the company stated recently that the order would equip all but fifty of the motor cars in use in Cleveland at the present time. The money represented is in the neighborhood of half a million dollars. The order is to be filled in fifteen months. Apparatus manufactured by the Walker Company is now in use in Alexandria, Egypt, in Paris and in a number of smaller places in France. The Walker Company has received important orders for electrical mining hoists from Australia, and it anticipates further business from the same direction.

It is reported that an American syndicate is arranging to build an electrical street railway system in Tampico, Mexico. A concession to establish large street-car works in the city of Mexico has been petitioned to the Government by Mexican capitalists. So influential are the parties having made the application that the undertaking is almost an assured fact.

Fifteen cars loaded with 10-inch patent lock-joint pipe were recently shipped to South Africa by the American Tube and Iron Company from its mills at Middletown, Pa. It will be used for a pipe line in the South African mining district.

The Finished Steel Company, Youngstown, O., manufacturers of polished shafting, recently made a shipment of three carloads of steel shafting to Glasgow, Scotland.

The Carbon Slate Company, of Slatington, Pa., exported during the month of June 11,403 squares of roofing slate, or 192 cars. Its largest single export shipment was 7,179 squares, which required 120 cars to carry it to New York. This company has shipped during the first six months of this year 30,394 squares, or 530 cars, 28,109 squares having been sent to foreign markets.

The General Electric Company is now sending forward shipments of the electric locomotives which are to be used on the London underground railroad, contracts for which were taken by this firm some months ago. In connection with this same work the Sprague Electric Company is shipping the elevator machinery and cars to be used at the various stations along the line.

An exhibition was recently made at Pittsburg, Pa., of the mammoth engines and generators that have been made for shipment to London. Three of these engines are bigger than any ever previously made for electric-lighting purposes. They are of 2,000 horse-power and will be used in co-operation with generators of 2,000 horse-power. These generators also surpass in size any ever built for lighting purposes. The big engines are to be sent to the Metropolitan Electric Supply Company of London.

A plate girder, 106 feet in length and 10 feet deep, has recently been built by the Pennsylvania Steel Company, whose export business is handled by the Maryland Steel Company, Sparrow's Point, Md., for the Grand Trunk Railway, and will form the centre truss of a double-track railway bridge. The girder weighs 64½ tons, and is the largest one that has ever been shipped by rail complete. There were required for its transportation two of the heavy gun-cars of the Pennsylvania Railroad, with an ordinary platform car between, to give sufficient distance. While longer girders have been sent by rail, this is the first case of one of such great weight, the best record hitherto being one of 50 tons' weight. On July 27th a cargo of steel rails was dispatched from Baltimore by the British steamer *Strathnevis*. This will almost complete the order for 35,000 tons of rails purchased by Russia from

the Maryland Steel Company for use on the new Siberian railroad. Seven steamships are now on the way to Russia with these rails.

The Ludlow Valve Company, of Troy, N. Y., has the distinction of having manufactured the largest and heaviest valve ever cast and made complete in any one shop in the world. The company made all the parts. The valve, which was shipped to Mexico, weighs 34,500 pounds, and is about 18 feet high and 8 feet wide, the diameter being 72 inches. An order has just been received for 925 valves, ranging in size from 4 to 28 inches, from St. Petersburg, Russia, to be used in the construction of the Moscow water-works. The shipments of this company to England and the Continent average a carload of valves a week.

Among other articles of a miscellaneous nature in the cargo of the German steamship *Pisa* were ten electric street cars. The cars are consigned to a street railway company of Hamburg, and are to be used experimentally alongside others made in Germany.

The American Impulse Wheel Company of New York is successfully introducing its water wheels in foreign countries. Lately shipments of wheels have been made to France, Japan, Sweden and Scotland, and there are prospects of considerable business from Italy, Australia and other markets, as inquiries for prices are constantly appearing. Mr. H. P. Campbell, the president of the company, says that it certainly looks as if American machinery is receiving a good deal of attention abroad, especially in connection with the installation of electrical transmission plants, for which large water wheels to generate power are used.

The Yerkes & Finan Woodworking Machine Company, St. Louis, is shipping two woodworking machines to Finland. It has only recently executed some large orders for Stockholm, as well as some for Norway.

Two hundred and twenty-six tons of American sewing machines were imported at Taganrog, Russia, in 1897, from the United States via Glasgow. These machines have taken such firm possession of the market in Russia that the only kind that can compete with them in a small way is the cheap German make.

G. T. Eames & Co., manufacturers of the Yankee drill grinder and punching and shearing machinery, at Kalamazoo, Mich., are sending a good many of their drill grinders abroad, having recently made shipments of them to England, Russia, Germany and Denmark, and only a few days ago they received orders for six more to be shipped abroad.

The Johnston Harvester Company lately exported 3,800 bicycles to Denmark. It is making weekly shipments of harvesting machinery to France and Germany, where there is a very large demand for it at present.

In the first nine months of the past fiscal year the exports of cars amounted to \$1,019,527, as compared with \$558,846 for the corresponding period of the year previous. In electrical and horse cars the increase has been even greater. At present several manufacturers of this class of cars are actively engaged with considerable construction for foreign orders. The ability of American manufacturers of street cars to compete with those of Europe has been fully demonstrated in recent orders which have been obtained from Japan, Australia, South America and even the continent of Europe.

The Chicago Pneumatic Tool Company writes as follows: "Our Monday's mail brings forth orders for 78 pneumatic machines, four of which are to go to the Imperial Chinese Railway, and covering a variety of tools, as follows: 44 pneumatic hammers, 8 pneumatic holders on, 6 riveting machines, 4 Boyer piston air drills, 12 breast drills for wood boring, 2 air hoists, 2 flue welders. For the dull Summer season we consider this a very gratifying showing for one day's mail."

An air-compressing plant recently installed at the Alaska-Treadwell Mine, Douglass Island, Alaska, includes what is said to be the largest Pelton water-wheel in the world. In this installation a duplex Riedler compressor with 24" cylinders is driven by a horizontal, cross-compound condensing engine, with 24" and 36" cylinders, and a 36" stroke. The steam cylinders are placed behind the air cylinders, and the piston rods are provided with couplings. Instead of the usual flywheel, a Pelton water-wheel, built by the Pelton Water Wheel Company, of San Francisco, is mounted on the compressor shaft. It is 22' in diameter, weighs 25,000 pounds, and when running under a head of 480' at its normal speed of 75 revolutions per minute develops 500 horse power, delivering 28,000 cubic feet of free air per minute. The largest wheel previous to this is operated by the North Star Mining Company, Grass Valley, California, and is 18' 6" in diameter. When from any cause it becomes necessary to shut off the water the piston rods are connected and the engine is started.





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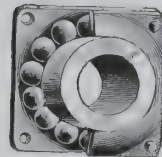
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Manufacturers of a Full Line of

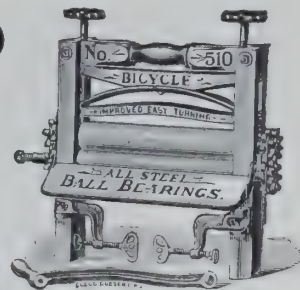
## CLOTHES WRINGERS,

### Rat and Mouse Traps

Send for Catalogue.  
Special attention given to export orders.  
Correspondence solicited in any language.



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### SPECIAL HIGH-GRADE ROLLS.

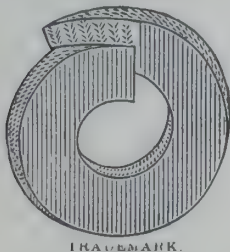


## SPEARE'S CROWN COLD WATER PAINT

### The Original Fireproofing and Waterproof Paint.

When combined with cold water makes the finest paint on earth. Especially adapted for out-buildings, private residences, factories, breweries, tanneries, stables, fences and cellars. Its fireproofing and waterproof qualities make it especially valuable for manufacturing establishments and large buildings of every description. Comes in powder form, in white and colors. Orders filled through commission houses. Send for color card, free sample and catalogue "L." Goods sold under absolute guarantee not to peel, crack or wash off. In ordering specify whether wanted for inside or outside use.

ALDEN SPEARE'S SONS & CO., No. 369 Atlantic Avenue Boston, Mass., U. S. A.



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## COULD'S STEAM AND WATER PACKING.

Patented June 1, 1880.—The Original Ring Packing.

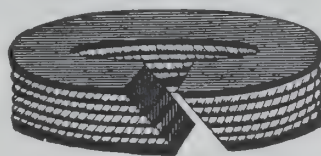
IN ORDERING, GIVE EXACT DIAMETER OF STUFFING BOX AND PISTON ROD OR VALVE STEM.  
SELF-LUBRICATING, STEAM AND WATER TIGHT.

Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. EVERY PACKING FULLY WARRANTED.

N. B.—This packing will be sent to any address, and if not satisfactory after a trial of 90 days, can be returned at our expense. None genuine without this trademark and date of patent stamped on wrapper. All similar packings are imitations and calculated to deceive.

THE COULD PACKING COMPANY, EAST CAMBRIDGE, MASS.

ORIGINAL RING PACKING.



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## SOLID BRAIDED CORDAGE.

Sash Cord,  
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SEND FOR SAMPLES.

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SAMSON BRAND

SAMSON CORDAGE WORKS. - - Boston, Mass., U. S. A.

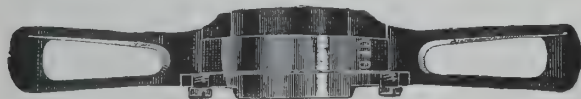
Pat. U. S. D. Heel Shave.

Made in 16 sizes.

## SNELL & ATHERTON,

72 Snell St., Brockton, Mass.

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Correspondence solicited. Catalogue "S" on application.

Edge Planes, Heel Shaves,  
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Knives for Machines made to order.

MANUFACTURERS OF

## FINE SHOE TOOLS

FOR EXPORT TRADE.

Patented  
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## THE WIRE FLY KILLER.

UNIVERSALLY USED ALL OVER THE WORLD.

Unsurpassed in houses, Stores, Etc. Does not crush the fly.  
Does not soil the most delicate wall paper or ceiling.

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J. F. BIGELOW, Manufacturer and Exporter,

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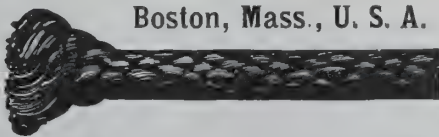
19 FOSTER ST., WORCESTER, MASS., U. S. A.

## SILVER LAKE COMPANY, THE ORIGINAL MANUFACTURERS OF

## Solid Braided Cordage.

WINDOW SASH CORD, { COTTON, LINEN OR  
RAILROAD BELL CORD, { ITALIAN HEMP.

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Boston, Mass., U. S. A.

THE BEST IS THE CHEAPEST.

CLOTHES LINES,

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STEAM PACKINGS. SILVER LAKE & MILLER SOAPSTONE PACKING.

Send for Samples.

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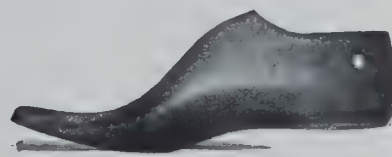
Manufacturers and Exporters of a

### Full Line of Men's, Women's and Children's **LASTS.**

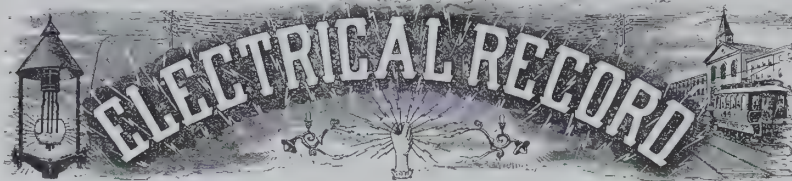
Orders filled through Commission Houses.

Correspondence solicited.

Worcester, Mass., U. S. A. Catalogue "B" on application.







*Devoted to the Foreign Trade in Electrical Appliances.*

### Trolley Systems in the Foundry.

AT a recent meeting of the Western Foundrymen's Association at Chicago there was an interesting discussion of the value of trolley systems in the foundry. While such systems are in use in some English and continental works of the most modern type, the following extracts from the remarks of one of the speakers may be of interest to some of the readers of THE AMERICAN EXPORTER as illustrating a notable branch of labor-saving inventions. We may supplement the account by saying that in many American works the cranes and, in fact, the entire "trolley" plant—so called—are operated by electricity. An account by one of the speakers of a modern overhead system follows:

"I am a firm advocate of trolley systems in a foundry. Some three or four years ago I had the privilege of going through the Walter A. Wood foundry in Hoosick Falls, N. Y. They used to run their iron on trucks on tracks. They have them thrown out completely and put in a double track overhead system. On their side floors they took the overhead traveller and suspended to them air hoists. The overhead track that ran down the centre delivered the iron to the side floors and the side floors carried ladles of their own. The ladle delivering the iron delivered it into the ladle on the side floor swung from the crane; the crane picked it up and moved it until on the side floor they poured it off, doing away with helpers to help carry out the iron, shaking out their own molds and piling up their flasks; where it took half a dozen men to wait on the molder before one and two men do it, and do the most of it at night. At night a few men took the castings out and carried them to the cleaning room and switched off down the line of barrels and left all the castings right at the barrels where they were to be milled. This overhead system passed over overhead scales; there sat a man and took the weights; they went into the machine room and were delivered at the machines, when the machine work was done on them; they were taken from the machines to the setting up departments on the same system. They were taken as finished machines and put into the warehouse.

"It would be surprising to anybody to go into that foundry to see the small amount of laborers' labor that was used; they cut out, they claim fully one-half of the laboring work and did it with this overhead system. I was so much impressed with it that I came back to my own works and installed it on a small scale there. I didn't have an overhead traveller, as we found the work could be lifted without the aid of it, but I used it in distributing the iron. I found we could put jobs on the bench that practically were made on the floors before and carried on with small bull ladles. These were delivered with the trolley ladles by carrying the length of the floor. With the truck system nine cases out of ten you stop at a given point and deliver iron around to six or eight floors. With this overhead system of delivery the iron was delivered direct to the floors and a man did not move from the head of his floor at all, but stood there and took his iron as it came along.

"I see no reason why the overhead system delivering iron to the floors with the overhead traveller and air hoist cannot handle iron and castings weighing anywhere from 10 pounds to 2,000 or 3,000 and do it quicker and easier and save labor. My foreman says the saving is 50 per cent. in some cases, 30 per cent. in others and 10 per cent. in others. It depends altogether on what you have to handle. I am a believer in the overhead system and expect it to pay for itself in a very short time."

### A Manufacturing Plant Without a Chimney.

WHEN the tracks of the New York, New Haven & Hartford Railroad were recently elevated at Jamaica Plain, Mass., it became necessary to remove a number of the adjacent buildings of the B. F. Sturtevant Company and to change the location of the existing boiler plant. The chimney, which had previously served as a means of producing draught, was thus rendered absolutely useless because of its distance from the new location of the boilers. It therefore became a question whether another chimney should be erected or a fan employed to produce the draught. Naturally

the latter method was adopted, for the B. F. Sturtevant Company is a large manufacturer of fans and is installing large numbers for the purpose of mechanical draught. Accordingly, a specially designed fan was placed on top of the boilers, connection was made to the uptake, and a short stack was provided extending just through the roof. The fan is equipped with a direct connected upright engine, the speed of which is so regulated by an automatic device that the draught is materially increased when the steam pressure falls slightly. The result is practically constant steam pressure. The arrangement has required no attention, fulfills the requirements, makes possible the burning of cheaper fuel, and has a marked influence in the prevention of smoke.

The deterioration of the unused chimney and the utilization of its bricks in the erection of a new building has led to a recent removal of the old means of draught production, and the passerby is now favored with the unusual spectacle of a large manufacturing establishment without a chimney, or at least anything that appears to be comprehended by the ordinary definition of such a structure.

That such means should serve as an efficient substitute for the chimney is not evident until one considers the peculiar adaptability of the fan for such a purpose.

Inasmuch as it is usually built of steel plate, its construction may be such as to most perfectly fulfill the requirements, for it may be used either for forcing the air to the ash-pits or exhausting it from the uptake; it may be placed above the boilers or in any location where the space is not valuable; its capacity may be varied at will; great intensity of draught may be maintained without reference to the conditions of the weather, which so often affects the working of a chimney; the draught may be maintained while the waste heat in the gases is utilized by economizers, and above all can be installed for less first cost than a chimney.

The rapidity with which this method of draught production is being adopted certainly warrants the presumption that the time is at hand when such evidence of its use as is indicated by the absence of a chimney will be found on every hand.

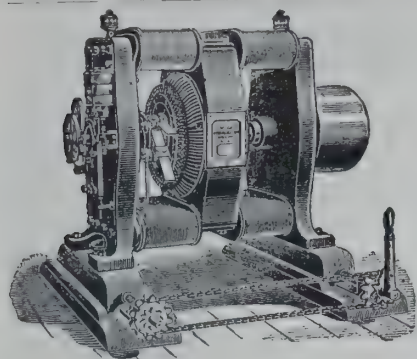
### Aluminum Cable.

THE Pittsburg Reduction Company has just completed the installation for the Niagara Falls Hydraulic Power and Manufacturing Company, at Niagara Falls, N. Y., of the first aluminum cable ever constructed. It is used to carry the current from the power house to the new factory of the National Electrolytic Company, high on the bank above, and weighs altogether 22,000 pounds. A copper cable sufficient to carry the same current would weigh 48,000 pounds.

This cable is made up of aluminum bars 25 feet long, 6 inches wide and  $\frac{1}{2}$  inch thick, four such being placed parallel and bound together. The bars are riveted and bolted every 25 feet. The cable extends along the side of the penstock, up the face of the cliff on brackets, and at the top is connected to aluminum cables, twelve of which are on each leg. These are  $1\frac{1}{4}$  inches thick, insulated with rubber. The bars are connected to the cables by castings which contain sockets holding the ends of the cables, around which is poured melted tin to make the joint permanent. The great saving in weight made it easy to handle the cable on the dangerous cliffs, and the aluminum was found to have double the conductivity for the weight of the copper cables formerly used. It has also been found that while the aluminum cables required greater insulation than copper, the manufacturers were willing to make up the difference on large contracts.

**A Great Generator.**—The Walker Manufacturing Company, of Cleveland, Ohio, has received an order from the Boston Elevated Railroad Company for the largest direct current generator ever built. It will have a rated capacity of 4,000 horse-power, said to be more than the output of any six generators now operating in Cleveland or St. Louis. The generator will be capable of delivering 5,000 horse-power for a few hours at a time. This machine will weigh more than 300,000 pounds, the revolving armature alone weighing over 100,000 pounds. The outside diameter of the field magnet will be about 24 feet and the field will contain 26 magnet poles. Another such apparatus is now in course of construction for a Kansas City, Mo., street railway corporation. To drive the great machine for the Boston corporation will require an engine of 5,000 horse-power, and the generator armature will be placed directly under the crank shaft of the engine, making, when completed, by far the largest engine and generator unit ever attempted.





# FORT WAYNE ELECTRIC CORPORATION,

Foreign Dept.: 115 Broadway, New York, U. S. A.

Factory: Fort Wayne, Ind., U. S. A.

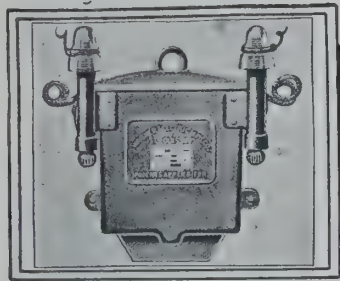
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The Cheapest Transformer is sure to prove the most expensive in the end

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GENERAL OFFICES AND FACTORY, ST. LOUIS, U.S.A.

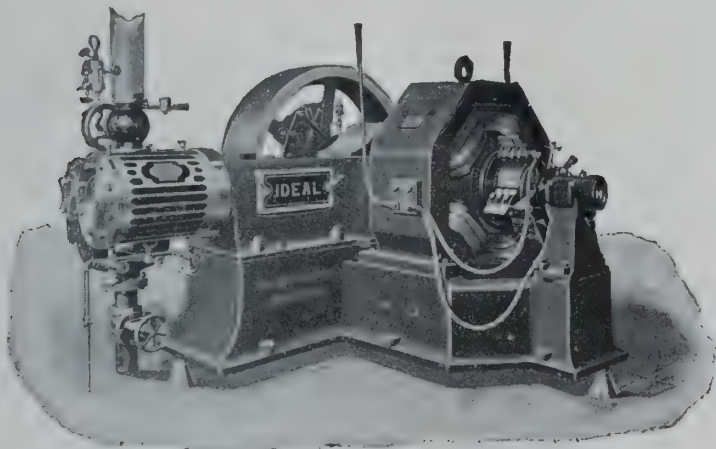
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Direct Current Transmission from Water Power.



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Electrical Equipments for Factories and Buildings.

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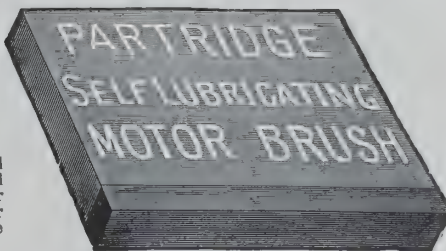
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These Carbons are for Generators and Motors of all kinds. Specially adapted for Fan Motors and Electric Street Car Work. In ordering through supply or commission houses send us duplicate order.



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AGENTS ALL OVER  
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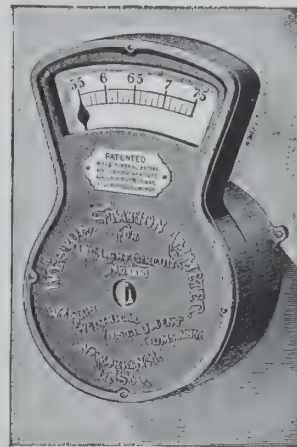
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U. S. A.The Weston  
Arc Light

## AMMETER

IS CHEAP, BUT  
NEVERTHELESS RELIABLE  
AND VERY ACCURATE.The scale is so proportioned that a change of  $\frac{1}{10}$  of one ampere can be seen from a considerable distance. The instrument is absolutely "dead beat." Three different ranges are being made:

No. 1.—5.8, 6.8, 7.8 amperes in $\frac{1}{10}$ ampere div.
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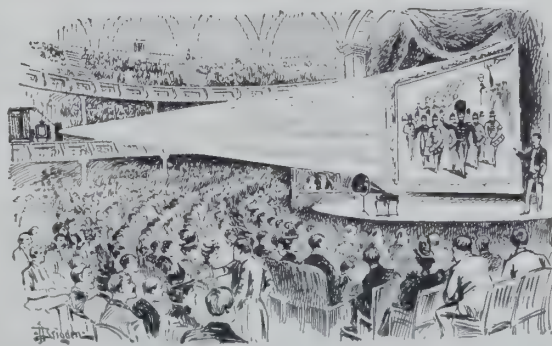
Every Theatre and  
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Should possess an EDISON  
COMBINED

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Combined Projectoscope and Stereopticon.....	\$100.00
Stereopticon Attachment alone for converting '97 Model Projectoscope into combined machine	25.00
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Can be used with electric, calcium or acetylene light. Write for catalogue No. 2, giving full information. The Edison '98 Model Combined Projectoscope and Stereopticon can be used for animated pictures and announcing the name and description of next picture, also for stereopticon views and animated songs, entertaining an entire audience the whole evening.

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These catalogues may be had free of charge on application to the firms issuing them.  
Please mention THE AMERICAN EXPORTER when you write.

THE SCHNEIDER MANUFACTURING COMPANY, 1135 Hamilton Street, Cleveland, Ohio, U. S. A. Price list of the "Gem" and "Globe" water motor fans, with numerous points regarding their use and superiority.

ADAM COOK'S SONS, 313 West street, New York, U. S. A. Catalogue and price list of Albany Grease manufactured by the Albany Lubricating Compound & Cup Company, of which they are proprietors. Numerous illustrations of the various styles of cups manufactured by them and suggestions as to using the lubricating compound.

THE AMERICAN FIRE ENGINE COMPANY, Seneca Falls, N. Y., U. S. A., have sent us their export catalogue for 1898, giving full description of various sizes and types\* of steam fire engines manufactured by them. Detailed and elaborately illustrated descriptions of special features, such as boilers, pumps, cylinders, etc., occupy several pages.

THE RIDER-ERICSSON ENGINE CO., 22 Cortlandt street, New York, U. S. A. Catalogue of hot-air pumping engines of both the Rider and Ericsson types. Clear and elaborately illustrated descriptions of all special features. A clever booklet giving some common-sense reasons for investigating the merits of hot-air pumping machinery accompanies the catalogue.

THE LUNKENHEIMER COMPANY, Cincinnati, Ohio, U. S. A., have just sent us their 1898 catalogue and price list. It forms a book of 208 pages with almost innumerable illustrations of the various types of valves, oil and grease cups, lubricators, cocks, washers, whistles and other specialties manufactured by them. The catalogue contains an index and a great deal of information of value to machinists and engineers.

THE BRADFORD BELTING COMPANY, Second and Walnut streets, Cincinnati, Ohio, U. S. A. Illustrated price list of "Monarch" wood-split pulleys, rivetless "Monarch" and "Bradford Dynamo" leather belting, and of "Monarch" insulating paint for electrical and chemical plants, distilleries, breweries, etc., and also for ships, docks and other structures, designed to withstand the action of salt air and water.

THE J. B. ALLFREE MANUFACTURING COMPANY, Indianapolis, Ind., U. S. A. Illustrated catalogue and price list of the "Economic" automatic engines. Fully illustrated descriptions of centre-crank and side-crank engines, compound condensing engines, "Economic" safety boilers, steam separators, air pumps and condensers, coolers and other special features greatly enhance the value and interest of the catalogue.

THE WILCOX & WHITE COMPANY, Meriden, Conn., U. S. A., have sent us a handsomely illustrated catalogue descriptive of the celebrated "Symphony" piano manufactured by them. After an interesting description of some of the technical features of the instrument, explaining how it is capable of rendering automatically with delicacy and power the widest possible range of music, are a number of pages filled with half-tone illustrations of the music-rooms of well-known people who now own the Symphony. An illustrated descriptive price list follows.

THE KILBOURNE & JACOBS MANUFACTURING COMPANY, Columbus, Ohio, U. S. A. Illustrated catalogue and price list No. 7 of trucks of all kinds, baggage barrows, express wagons, grain and meat wagons, hand carts, push carts and similar articles. Also general catalogue No. 27 of wheelbarrows, plows, scrapers and a great variety of similar implements, together with contractors' carts, dump carts and wagons and the like. Catalogue No. 28 of contractors' dump cars, steel, ore and mining cars, foundry and coal cars, etc. Illustrated, and contents alphabetically indexed.

The Japanese cruiser *Kasagi*, which has just been completed at the Cramp yards, in Philadelphia, made her official trial run off the New England coast a few weeks ago. She made a speed average of  $22\frac{3}{4}$  knots an hour, a quarter of a knot above the contract requirement, for a distance of forty miles. The trial was made under conditions not the best, which tended to show the vessel's performance in stronger light. The *Kasagi* enjoys the distinction of having been completed six months in advance of the contract time for her delivery. All of the Japanese representatives on board the big cruiser were pleased with the performance of the vessel.

### Change in Russian Tariff.

A LAW has recently been published permitting the entrance into Russia from abroad, duty free from the 1st of July for ten years, of complete iron ships destined for navigation in foreign seas. The law also deals with private seagoing steam yachts, dredgers, ice-breaking steamers, floating docks, and all vessels destined for use on the Danube under the Russian flag. Further, anchors and chains to form part of the equipment of Russian ships are assured entry free of duty for ten years. Excluded from these privileges are customs payments still due to the Crown for vessels in the above category which shall have been purchased before the 1st of July. The following duties, to date from the 1st of January, 1899, are fixed for iron ships destined for navigation in inland waters and the Caspian Sea, as well as for tugs, lighters for harbors, and floating cranes: Ships without steam engines shall pay 20 gold roubles per ton; ships with steam engines the same, in addition to 3 gold roubles per square foot of boiler-heating surface. For complete wooden river ships the following are the duties, the date from which they are to be imposed being the same as in the preceding case: Ships without steam engines, 8 gold roubles per ton; ships with steam engines the same, in addition to 3 gold roubles per square foot of boiler-heating surface.

**Good Times Surely Coming.**—After a most careful survey of the existing trade conditions, *The National Provisioner* feels justified in confidently predicting that an era of almost unprecedented activity and prosperity is surely in sight for the trade and commerce of the United States. Both actual and sentimental promises for a most favorable development are absolutely secured, and the possibilities of disturbances are reduced to next to none. The glory of success on the fields of honor will very soon be followed by the more tangible blessings of unprecedented success on the peaceable battlefields of international commerce. Stronger than ever, more closely united than ever, more determined than ever, the brainy people of the United States, now universally recognized as a great nation, enter upon a new phase in their economical growth by asserting their international claims. Nobody doubts that full success will crown these efforts.

Spain's loss of sovereignty over the island of Cuba means practically the entire loss of trade with her former colony. Spain was only able to hold the Cuban market because of the discriminating tariff in her favor, but now that tariff no longer exists Spanish manufacturers will be at the mercy of American competition. One of the great industries of Massachusetts, the boot and shoe, will profit by the new conditions. In 1896 we exported to Cuba only \$34,000 worth of boots and shoes, while in that year Spain sold the same articles to the value of \$3,449,000. American boots and shoes are known all over the world, and with an equal tariff the trade which formerly went to Spain will now be transferred to the United States.

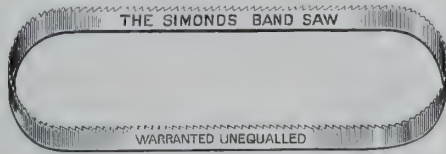
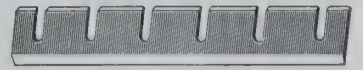
Our export trade in candles, while not representing a very large amount in value, some \$232,000 last year, shows a considerable quantity—3,072,369 pounds. There was an increase of rather more than 400,000 pounds in the quantity of American candles exported last year, as compared with 1897. At the same time there was a gain of nearly 5,000,000 pounds in the shipments of soap that we made to foreign countries.

**Electrical Enterprise in the Philippines.**—There are about 720 miles of telegraph in the islands and only 70 miles of steam railway. Manila has a telephone system equipped with English instruments. All electrical conductors are carried on overhead pole lines with porcelain insulators. There is also a horse railway in Manila which would have been changed over to a trolley road had not the war occurred. The concession for this road had already been acquired. A central electric lighting station in Manila supplies current for 12,000 incandescent and 260 arc lights. The machinery is of American manufacture.

**Electric Lines in Cuba.**—The *Street Railway Review* calls attention to the remarkable opening for electric railways in Cuba. At present no electric roads exist in Cuba, but there is a very large amount of travel on the various coasting steamers, on the vessels running up the small rivers, and on the railroads and on the few 'busses that run to the suburbs of the larger towns. These conveyances are generally overcrowded, notwithstanding that exorbitant rates are charged.

The battle of Santiago de Cuba is considered, according to a Berlin dispatch, to have proved the superiority of American armor plate and artillery, and it is believed that in the future European nations will give larger orders to American makers for armor, guns and other naval equipment.



**SAWS.****Machine  
Knives.****SIMONDS M'FG COMPANY,**

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**JAMES HILL MFG. CO.**

PROVIDENCE, R. I., U. S. A.

Manufacturers  
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Write for Catalogues "O" and "P."

Roving Cans, viz.: Vulcan Fibre, Hill's IXXX Tin and all kinds of Mill Boxes and Cans.

Also Galvanized Sheet Iron Goods, Ash and Garbage Cans, Fire Pails and Buckets, etc.

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**High-Class Monuments.**

Manufactured from all the best American and Foreign Granites.

All our work guaranteed strictly first-class and according to contract.

FACILITIES: The most improved machinery, artistic designers, skilled workmen.

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**THOMAS & MILLER, Quincy, Mass., U. S. A.****ATLANTIC VARNISH WORKS,**VARNISHES ESPECIALLY  
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As cheap as ordinary paint with this valuable fire-preventing property.

For Varnishes address ATLANTIC VARNISH WORKS, Richmond, Va., U. S. A.

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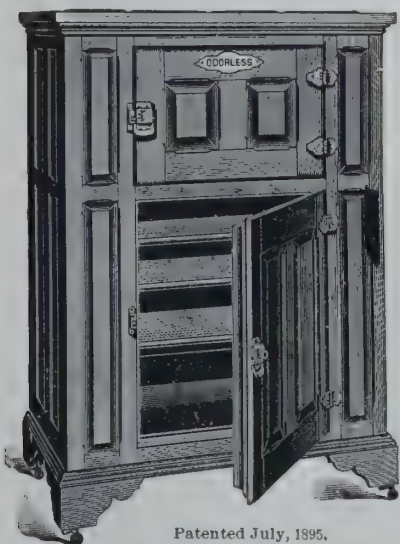
ROYAL DAUBER.

**Shoe Polishers and Daubers.**We make a large line of **WOOL POLISHERS** for russet shoes,  
and **IRON-HANDLED DAUBERS** for black shoes.

WRITE FOR PRICE LIST B.

**PARKS & PARKS, - Troy, N. Y., U. S. A.****THE  
"Easy" Bolt Clipper**  
**IS THE BEST.**

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**H. K. PORTER, 66 Beverly Street, BOSTON, Mass., U. S. A.**

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**"Odorless"  
Refrigerator**

A Scientific Preserver of Food.

The air circulation is so perfect that One Dish  
Won't Taste of Another.

A GREAT ICE-SAVER.

NEEDS NO WASHING OUT.

It is endorsed by the most famous cooks in  
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Correspondence solicited.

Shipments direct to importers or through  
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Send for illustrated catalogue, FREE.

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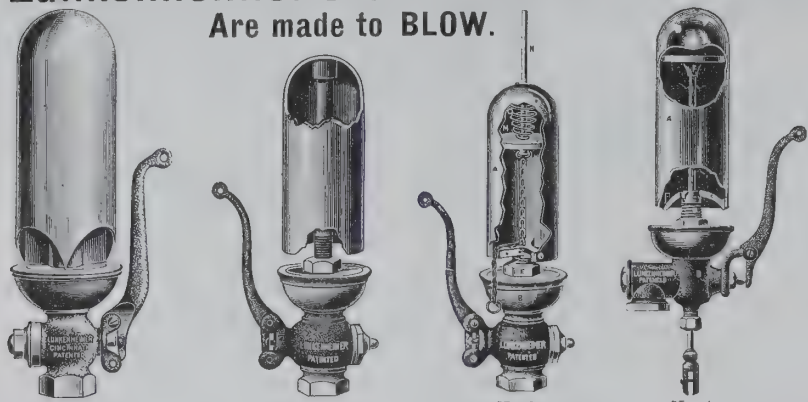
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Are made to BLOW.



No. 1. Single Bell Chime Whistles, 2 to 10 in. diam. of bells. No. 2. Plain Whistles, 2½ to 6 in. diam. of bells. No. 3. Mocking Bird Whistles, 2½ to 8 in. diam. of bells. No. 4. Fire Alarm Whistles, 2½ to 8 in. diam. of bells.

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We raise FANCY POULTRY in all the Popular American Breeds, and have had a large experience in SHIPPING FOR EXPORT.

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Also a full line of **SUPPLIES**, such as Incubators, Brooders, Green Bone Mills, Drinking Fountains, Nest Eggs, Caponizing Tools, Etc. Poultry Foods and Medicines. Bee Supplies.

ILLUSTRATED CATALOGUE FREE.

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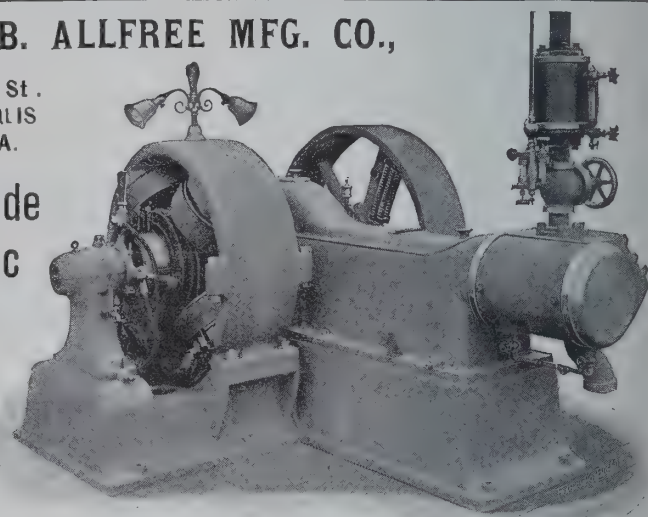
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BEST AMERICAN BREED.

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**High-Grade  
Automatic  
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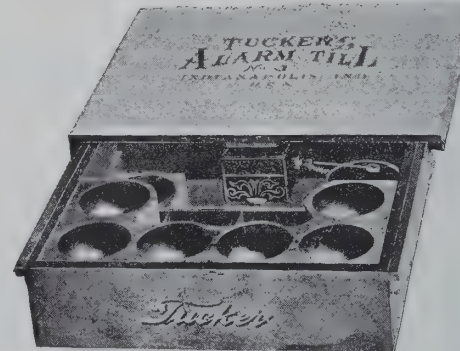
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OVER ONE MILLION NOW IN CONSTANT USE.

No key to be lost.

Susceptible of 32 changes.

Opens like a common drawer.

A terror to sneak thieves.



Handsomely finished in Walnut, Oak or Cherry Woods.

Varnished and Polished

As a piece of cabinetwork, well worth its cost.

SOUNDS THE ALARM PROMPTLY IF TAMPERED WITH.

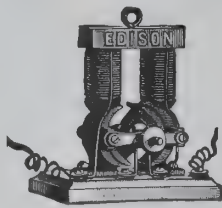
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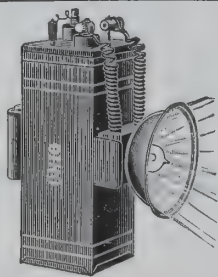
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Necktie Light.



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\$6 Bicycle Light. \$2.75

We undersell all on everything Electrical.

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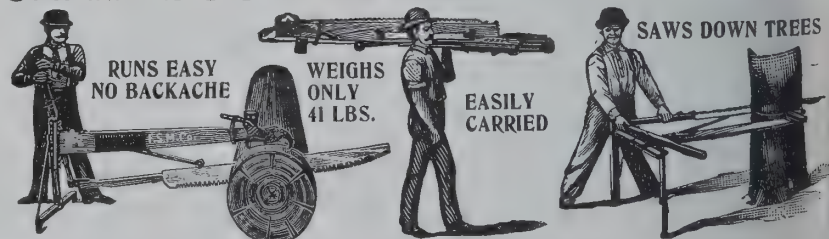


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RUNS EASY  
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WEIGHS  
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EASILY  
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SAWS DOWN TREES

It saws down trees. **Folds** complete as a pocket knife. **Weights** only 41 lbs. One man can carry it on his shoulder **easily**. It saws any kind of timber on any kind of ground. It is **instantly** adjusted to the ground and log so that the log is always cut **square** in two. It makes no difference how **rough** the ground is, and the operator never has to bend his back. **9 CORDS** have been sawed by one man in **10 HOURS**. It is a great labor and money saver, as one man can saw **more** wood with it than two men can in any other way, and do the work a great deal **easier**. It is made in two sizes. No. 1 carries a saw 5½ or 6 feet long and saws any tree under 3 feet in diameter. No. 2 carries a saw 5½, 6, 6½ or 7 feet long and saws any tree under 5½ feet in diameter. Send for free illustrated catalogue showing latest improvements and complete description, and **special** prices in **large** lots.

Net Price List, F. O. B. New York, Weights and Measurements.

One No. 1 machine	.....	\$15.00 each;	Gross Weight, 84 lbs.;	Measurement, 5' 0" x 3' 10" x 0' 10"
One-half doz. No. 1 machines	.....	13.00 "	"	5' 9" x 3' 6" x 1' 0"
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Or THEODORE CARR, 26 Lisimore Terrace,  
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MANUFACTURERS OF

**Pure Oak Tanned  
Short Lap Single  
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Double Belting.**

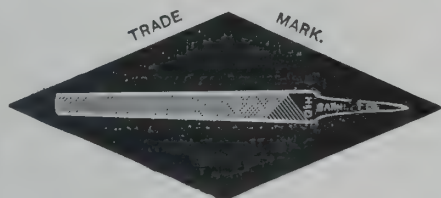
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Twelve  
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## Paper Bag Machinery.

We manufacture machines for making  
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Also shirt, hat, millinery and flour bags.

## THE NATIONAL MANUFACTURING CO.,

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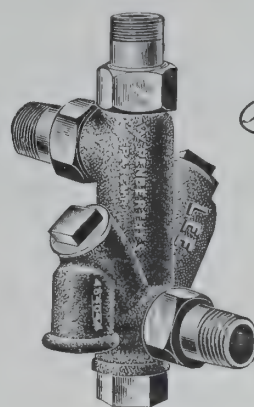
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Stationary  
Gas  
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**ALSO YACHTS AND LAUNCHES** fully adapted for tropical countries.

**The Best Is Always the Cheapest!** We are the oldest builders of Marine Gas Engines  
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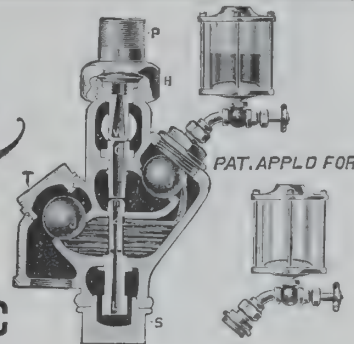


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PENBERTHY PATENT

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**Automatic**

**INJECTOR.**



**PERFECT BOILER FEEDER. COMPLETE PURGER INJECTOR.**

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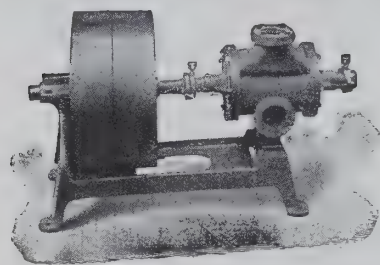
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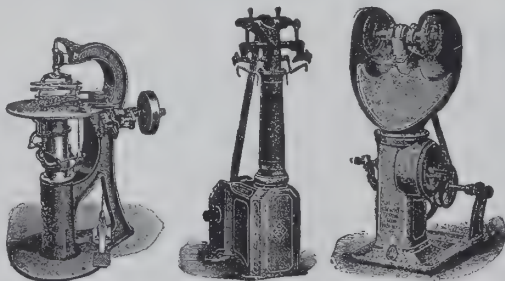
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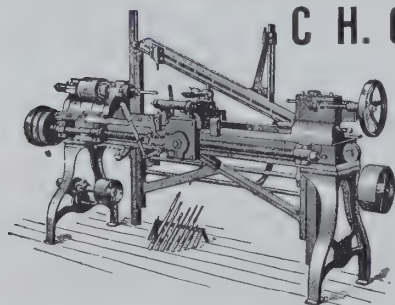


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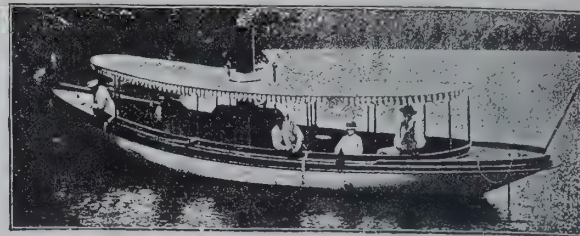
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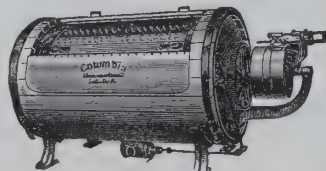


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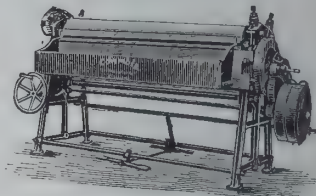
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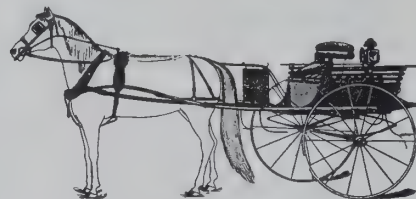
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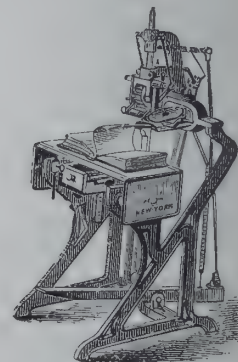
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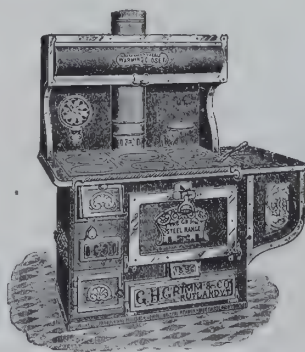


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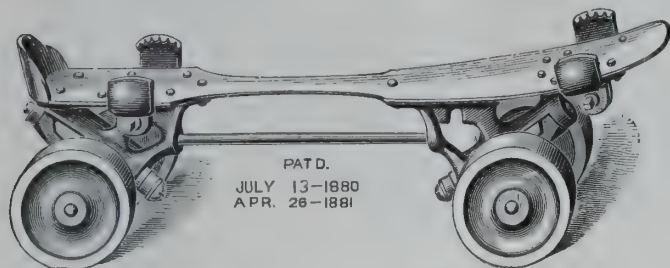
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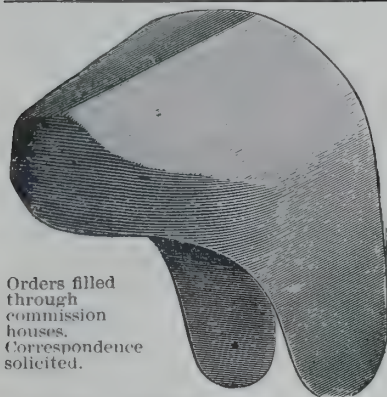
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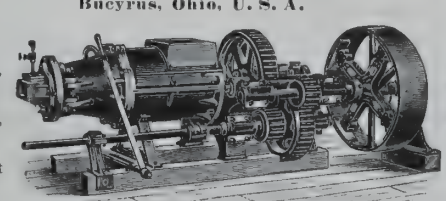
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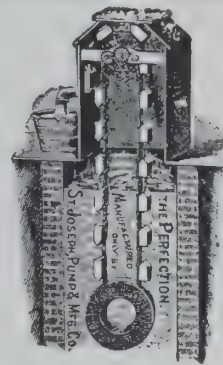
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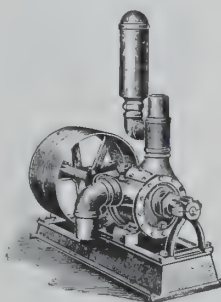
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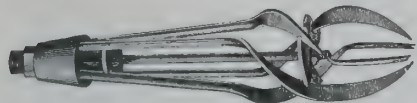
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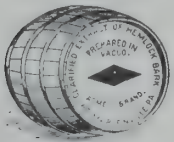


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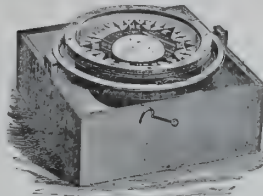
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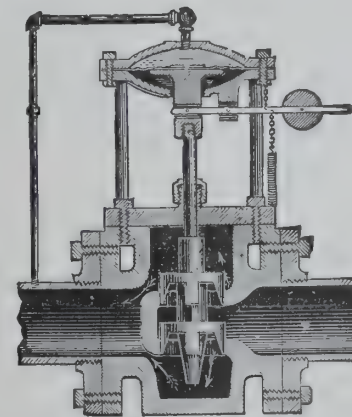
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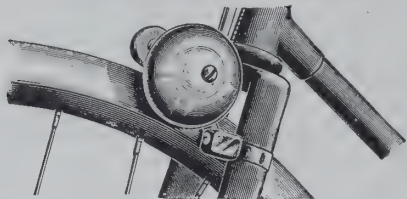
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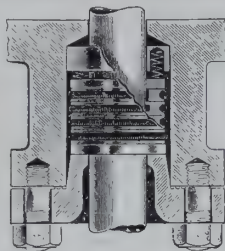




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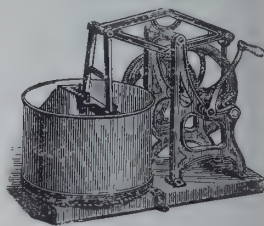
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Affords delightful amusement for old and young. Attractive and simple in construction and operation. Complete outfit, seating 56 people, with galloping horses, chariots, organ, engine and boiler, ample tent.

Send for Illustrated Circular, Prices, etc., to the Manufacturers.

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Does away with handle bar clamp; adjusts in any position with top nut, which binds stem in head and bar at same time. Thousands in use. All shapes. We sell bars nicked or unnicked, or binders. Catalogue on application. Orders filled through commission houses.

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**Dynamos and Motors.**

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Orders filled through commission houses.

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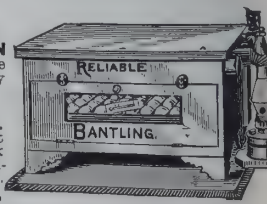
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HAS LOST HER OCCUPATION and in the production and brooding of chicks she has been supplanted by the better and every way

**RELIABLE INCUBATORS AND BROODERS**

They Hatch and Brood when you are ready. They don't get lousy. They grow the strongest chicks and the most of them. It takes a 224 page book to tell about these machines and our Mammoth Reliable Poultry Farms. Sent by mail on receipt of 10 cents. Send for it now. Reliable Incubator and Brooder Co., Quincy, Illinois.

**LIVE 100 YEARS** by drinking water from **THE SANITARY STILL.**

NATURE'S METHOD IMITATED.

It eliminates both organic and inorganic matter, and at the same time aerates it with sterilized air, making it not only absolutely pure, but as palatable as spring or mineral water. The SANITARY STILL goes on any stove, requires no water connections; simple and efficient. Will last a lifetime. Price, \$10 to \$15. Catalogue on application. Satisfaction guaranteed or money refunded.

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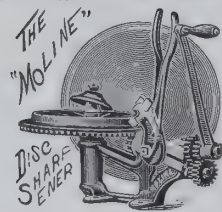
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ARE THE BEST  
"PRACTICALLY UNBREAKABLE"  
SAYS THE WORLD'S FAIR AWARD.

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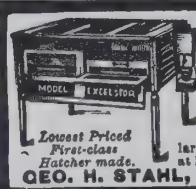
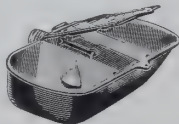
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Will keep stock healthy.

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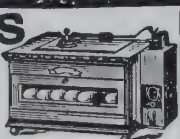
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Simple, Perfect, Self-regulating. Thousands in successful operation. Guaranteed to hatch a larger percentage of fertile eggs, at less cost, than any other hatcher.

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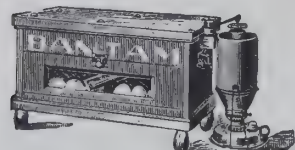
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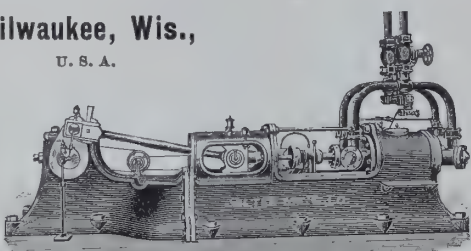
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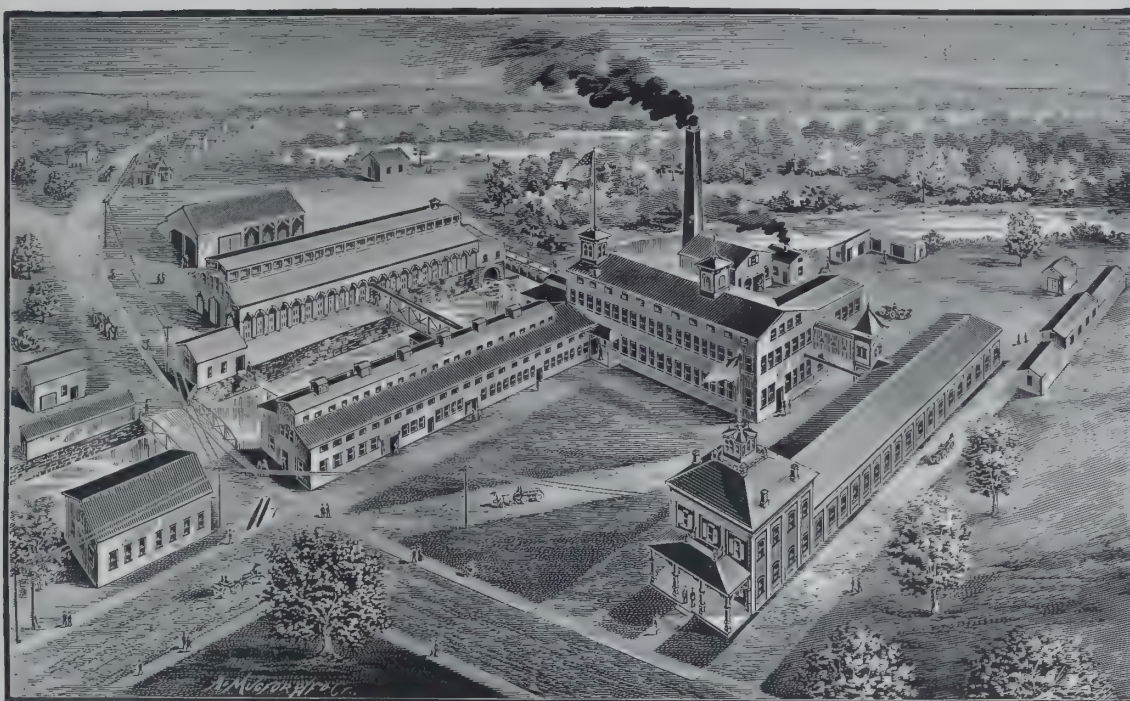


# THE H. D. SMITH & CO.

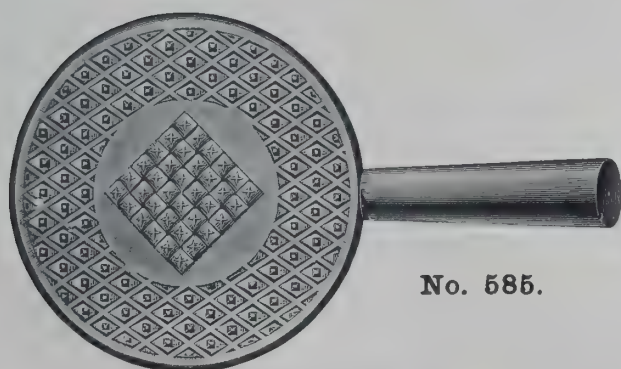
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MANUFACTURERS OF

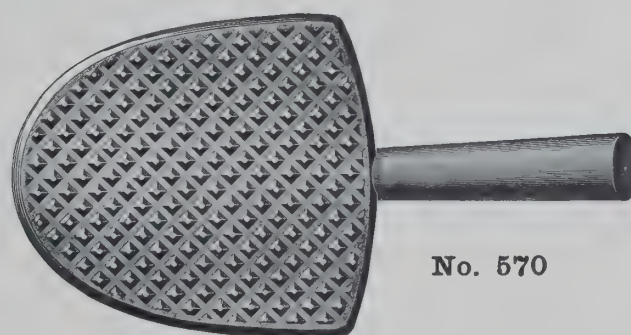
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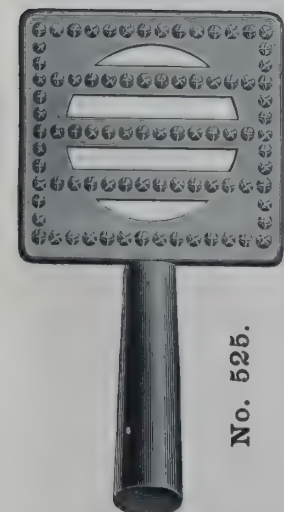
THE H. D. SMITH & CO WORKS, PLANTSVILLE, CONN., U. S. A.



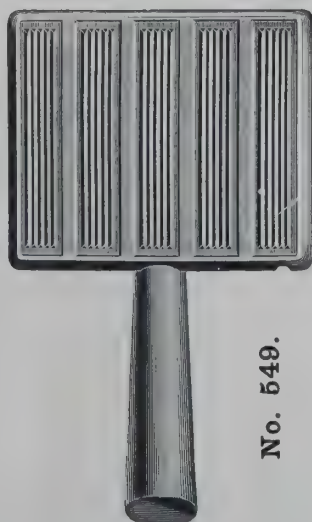
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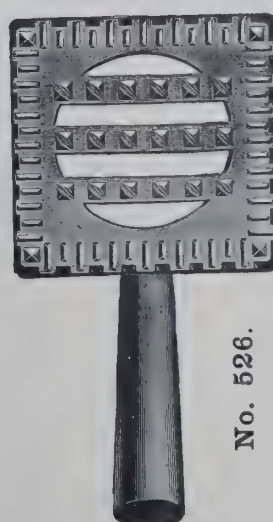
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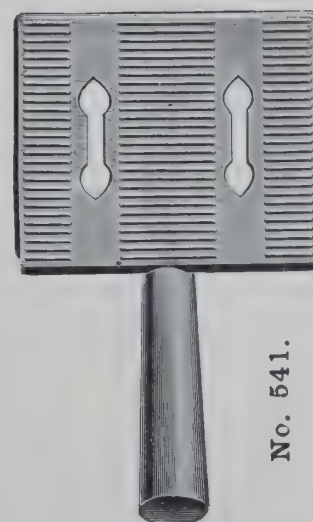
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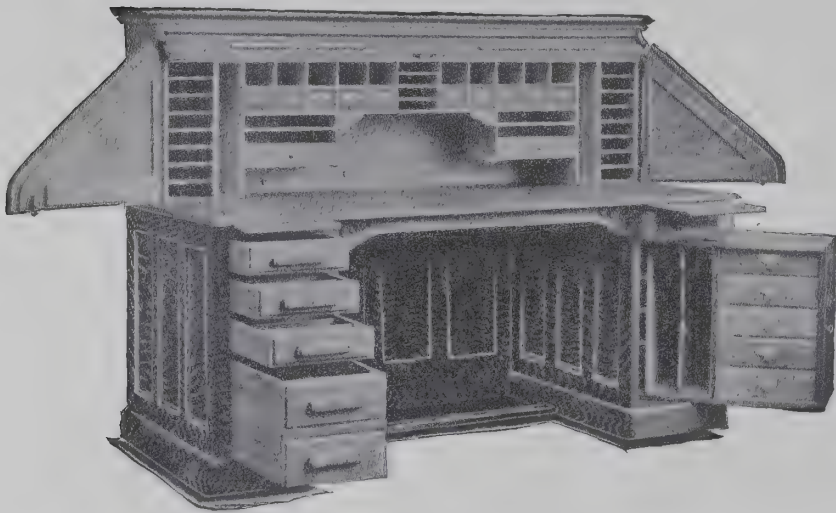


# DESKS!

# DESKS!!

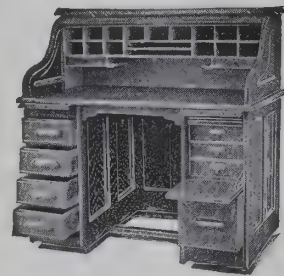
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NO. P. 301, "A."

**\$45.00** buys this desk exactly as illustrated. It is 66 inches long, 33 inches wide, 51 inches high. It is made of the finest selected quarter-sawed white oak, and has swinging side arms and FIVE COMPLETE LETTER FILES. 66 inches long, style "A," \$45.00. Style "B" or "C," \$41.00. 72 inches long, style "A," \$49.00. Style "B" or "C," \$45.00.



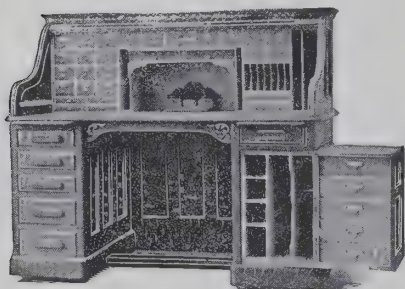
NO. P. 10 E.

**\$19.75** buys this desk exactly as illustrated. It is 48 inches long, 30 inches wide, 51 inches high. It has quarter-sawed oak front, closed back and THREE LETTER FILES in right pedestal under lock and key. This desk has been A GREAT SELLER.



NO. P. 243, STYLE "B."

**\$17.00** buys this desk exactly as illustrated. It is made of quarter-sawed white oak and is supplied with LETTER FILES and large drawer in right pedestal. Size, 36 inches long, 28 inches wide, 44 inches high.

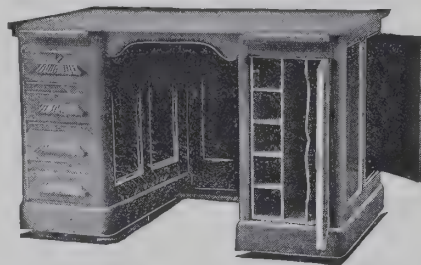


NO. P. 212, STYLE "A."

**\$43.50** buys this desk exactly as illustrated. It is 60 inches long, 33 inches wide, 52 inches high. It is an extra fine desk, made of quarter-sawed white oak and has FIVE COMPLETE LETTER FILES in the right swing pedestal.

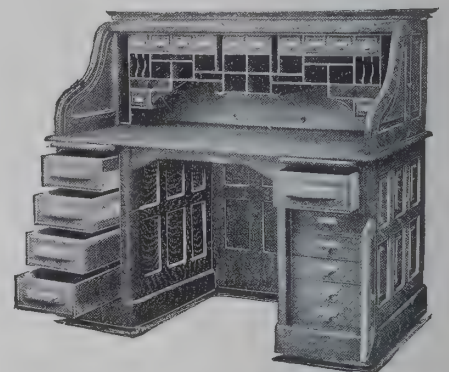
60 inches long, style "A," \$43.50.  
Style "B" or "C," \$40.00

**NOTE.**—Style "A" has drawers in left pedestal and letter files in right pedestal as illustrated. Every person must have some place for letters, invoices, receipts, etc. Style "A" provides complete LETTER FILES within arm's reach, dust proof and under lock and key—a very desirable feature. Style "B" has drawers in both right and left pedestals. Style "C" has drawers in left pedestal and book cupboard in right pedestal.



NO. P. 216, "C"

**\$11.60** buys this desk exactly as illustrated. It is 50 inches long, 30 inches wide, 31 inches high. It has closed back and is made of selected oak. Style "B" or "C," \$11.60.



NO. P. 241, STYLE "A."

**\$35.00** buys this desk exactly as illustrated. It is 55 inches long, 32 inches wide, 51 inches high. It is made of the best figured quarter-sawed oak or cherry, and has FIVE COMPLETE LETTER FILES in right pedestal.

50 inches long, style "A," \$32.50. Style "B" or "C," \$27.50.  
55 inches long, style "A," \$35.00. Style "B" or "C," \$30.00.  
60 inches long, style "A," \$37.50. Style "B" or "C," \$32.50.

## INFORMATION.

ALL PRICES given above include cost of boxing and delivery to New York City ready for export.

ALL DESKS are made of the best quality of white oak and are supplied in either light, medium or dark finish to suit purchaser, medium being supplied unless otherwise requested. All our desks are finished with best quality of piano polish finish.

ORDERS: We are well known to the leading export merchants of New York City, any of whom will be pleased to execute orders for our goods.

CONSTRUCTION AND PACKING: We have made a careful study of the needs of the export trade in this matter, and all desks are made with our "sectional construction," permitting them to be quickly taken apart and put together. This construction also permits snug packages, insuring both safe delivery and lowest freight rates.

# THE FRED MACEY Co.

Makers of Office and Library Furniture.

Grand Rapids, Mich., U. S. A.

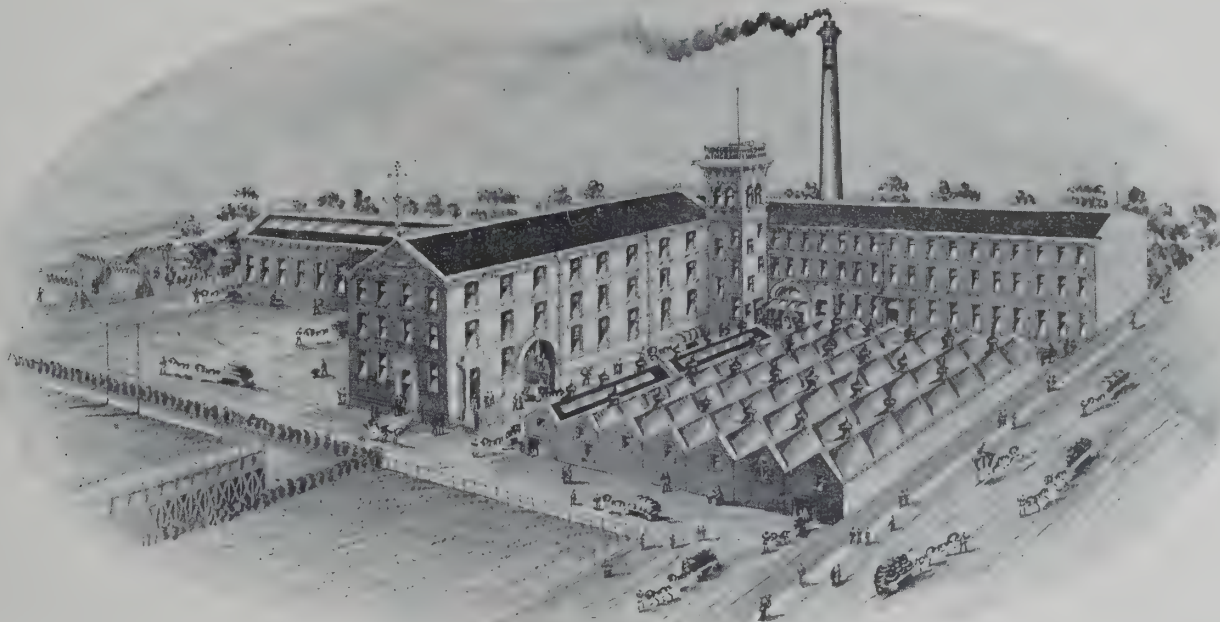


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With Smooth and Bright Hardened and Tempered Steel Wire; also  
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CARDING ENGINES CLOTHED, GROUND AND STARTED  
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**Oldest and Largest Manufacturers  
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Wholesale Manufacturers and Exporters of the following STANDARD BRANDS  
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## "GILT EDGE" OIL POLISH,

for ladies' and misses' shoes, is far superior to all others, as it blacks, polishes, softens and preserves the leather. Bottles hold about DOUBLE the usual quantity. Price per gross, \$16.00; discount 10 per cent.

## "SUPERB" PATENT Leather Polishing Paste.

The only article that will produce a quick, brilliant and waterproof lustre without injury to the leather. The professional bootblacks of the United States use far more of this article than all other makes combined, because it



polishes quicker and easier, and requires less of it to do the work. Large size, per gross, \$8.50; discount 10 per cent. Small size, per gross, \$5.00; discount 10 per cent.

## "STAR" COMBINATION



package contains a 2-oz. bottle of russet leather cleaner and a small decorated tin box of russet leather polishing paste. The cleaner removes the dirt and stains, and the paste adds a brilliant, durable and waterproof polish. Price per gross, \$8.00; discount 10 per cent.

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For giving russet and yellow colored shoes a brilliant, durable and waterproof polish. Try it once and you will never be satisfied with any other polish. Per gross, large size decorated tin boxes, \$8.50; discount 10 per cent. Small size, \$5.00 per gross; discount 10 per cent.



**FRENCH GLOSS.** Warranted fully equal to the best \$9.00 black dressings in the market (and put up handsomer). With handsome three-color lithographed cartons and wood caps over corks. Price per gross, \$8.00; discount 10 per cent.

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All first-class articles that suit every one. If you are not suited and want the best, send us a trial order. Orders can be sent through any commission house in New York or Boston. Send for illustrated price list.

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affords the most simple, economical and efficient power for all purposes.

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Novelty (Self-closing) Inkstand No. 3,

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All our goods, numbering more than 50 different articles, are patented, controlled and manufactured exclusively by ourselves, and are sold all over the world, about one-half of our business being for export. They are all standard novelties in every sense of the word, and have been awarded numerous premiums at the universal expositions of Sydney, Melbourne, Adelaide, Barcelona and Paris, for novelty, workmanship, finish, simplicity, utility and cheapness.

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Hand presses, easy to use by man or boy. Type-setting and good printing easy by full printed instructions sent.

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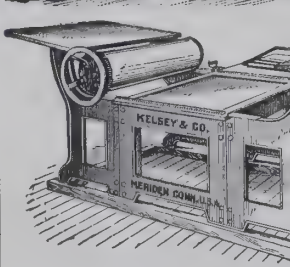
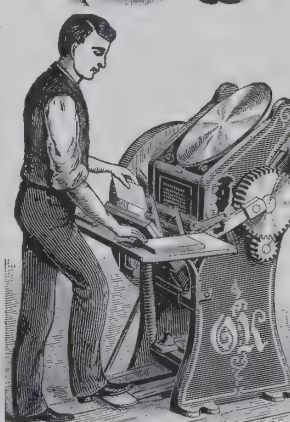
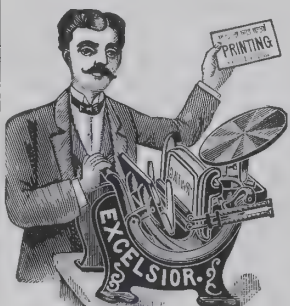
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For newspapers and large announcements. Bed, 29x43 inches. Price, \$5.00. Includes 300 pounds small type, 25 fonts assorted types, inks, rules, etc., for newspaper. All our outfits complete, ready for instant use.

Catalogue free by mail of presses, types for all languages, paper, cards, etc. Write to our factory near New York.

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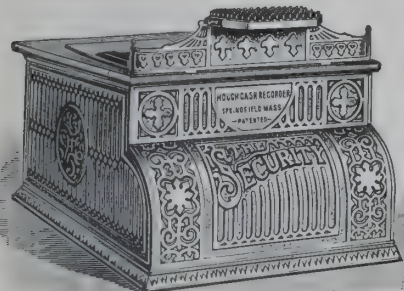
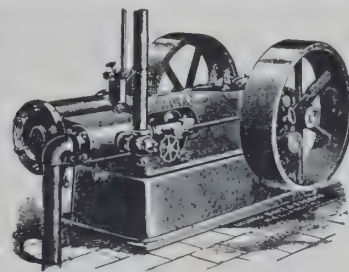
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HAS LARGE WEARING SURFACES,  
MATERIAL AND WORKMANSHIP FIRST-CLASS.STRONG AND VERY RIGID FRAME,  
ALL PARTS INTERCHANGEABLE.

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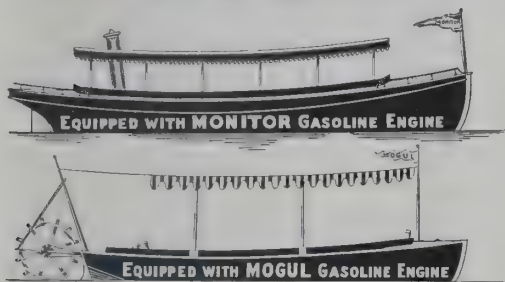
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Gas or Gasoline  
Engines,  
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## LAUNCHES AND BOATS,

With reversing propeller blades or stern paddles.

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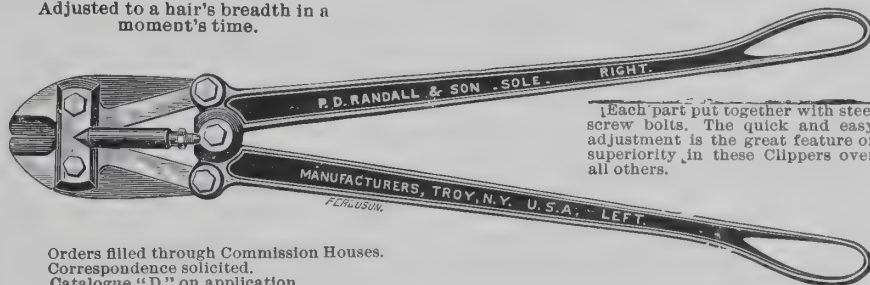
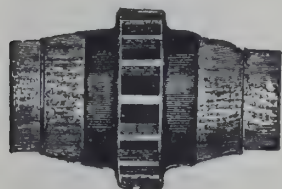


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No weak spots in the whole Clipper. Knives tempered in the most careful manner. Every Clipper thoroughly tested before it leaves our factory. No. 3 cuts 3/8 inch or less; No. 4, 1/2 inch or less; No. 5, 3/4 inch or less. Address

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Adjusted to a hair's breadth in a  
moment's time.Each part put together with steel  
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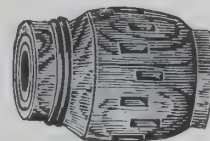
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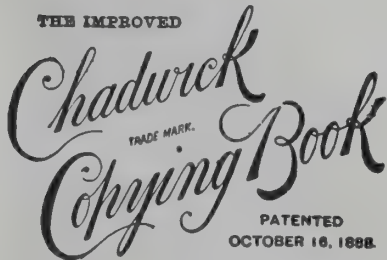
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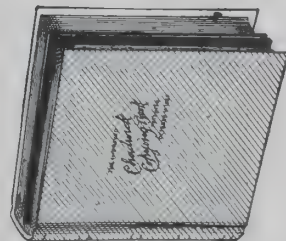
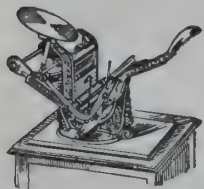
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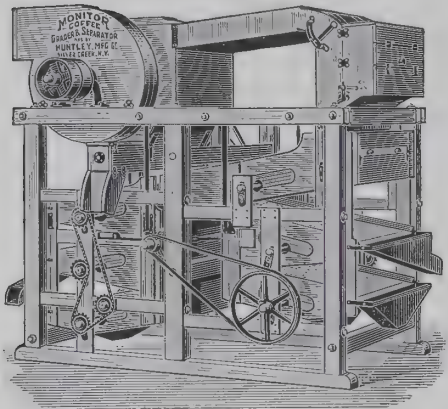
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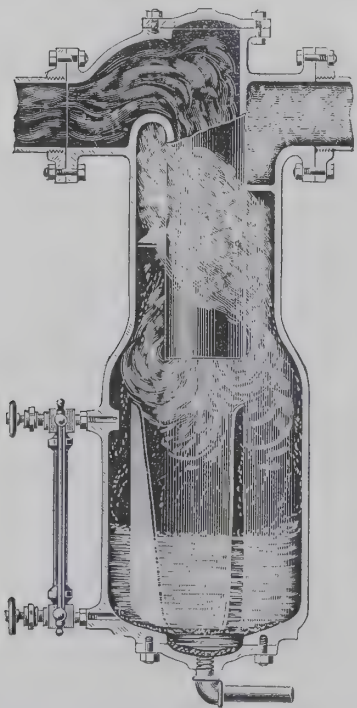
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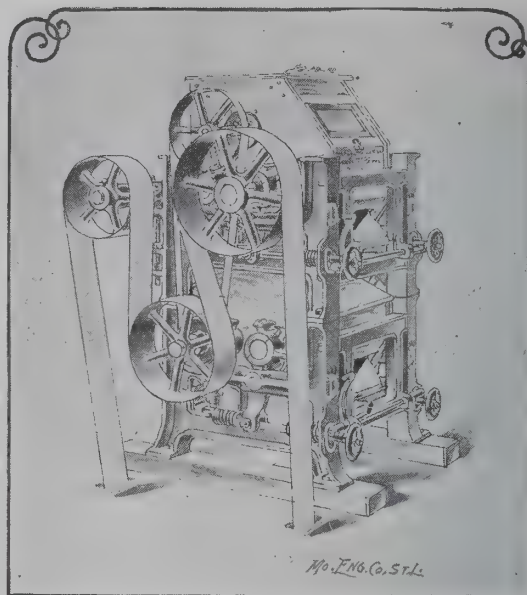
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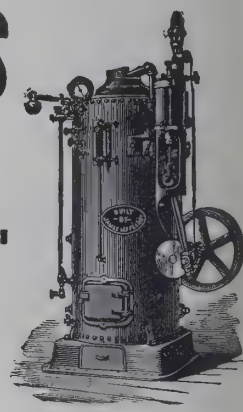
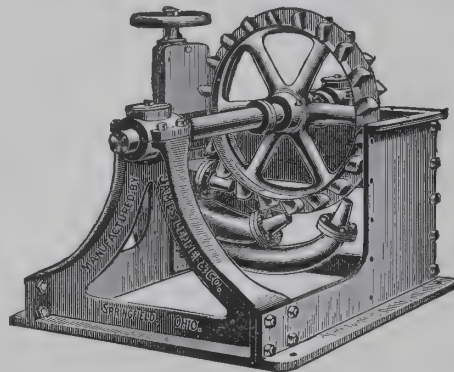
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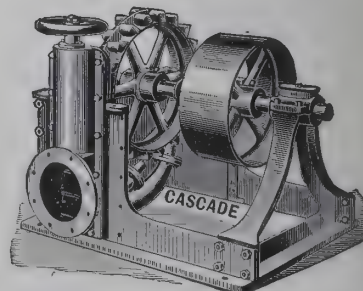
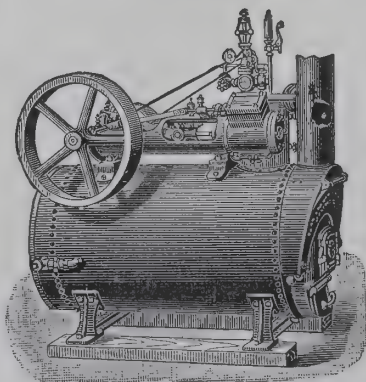
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(Founded by HOWARD LOCKWOOD & Co., 1877).

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### A NATIONAL COMMENCEMENT.

ONE of the members of the Cabinet at Washington in a recent address used a very happy figure of speech in describing the significance of the recent war with Spain and its probable effect upon the boundaries of the United States. "We have graduated," said the speaker. "Our commencement exercises, which were held at Manila and Santiago, were uncommonly interesting."

As this expression may not convey to all of our readers precisely the same significance that it possesses for an American, we may explain that in this country the last day of the school or college year is termed "Commencement Day," the idea being that for the students who are graduating the chief interest of the occasion is not centred in the years of study through which they have passed but in the years of active life for which the past has been but a preparation and of which the present occasion is the beginning or "commencement." (The origin of this use of the word was, we believe, accidental and based on other grounds than those we have mentioned, but during the two and a half centuries that the word has been used with reference to educational institutions its popular significance has come to be what we have stated.)

The application of the word to the present position of the American people and Government is finely suggestive. As a well-known English review expressed it, we are now at the parting of the ways. All that has gone before has been in a way only preliminary and preparatory. It is an old adage that he who would govern others must first learn to govern himself. That lesson the American people have been learn-

ing for nearly three hundred years, and if we include the rich heritage of political experience that our first settlers brought across the Atlantic with them, for fifteen hundred. Those who have not made a study of the subject can hardly realize the extent to which what we may term the Anglo-Saxon theory of government has taken hold of the American people. Whenever a little group of settlers pushed into the wilderness there presently sprang into existence, spontaneously as it were, instinctively certainly, a miniature republic. The ablest man became "selectman"; to others, either individually or in committees, were assigned the various executive functions of a self-governing community. The ideal toward which each little settlement struggled at first was to possess a "meeting house," or church, and a school. Freedom was everywhere—freedom of thought, of belief, of action.

After the first colonizing period of our development was passed there came another and essentially different process of political growth. For the past hundred years we have been constantly absorbing the never-ending stream of immigrants that flows to this country from nearly every land where domestic conditions do not afford entire contentment to those who are most enterprising and ambitious. In two generations these foreign elements are thoroughly assimilated and made intelligent and useful members of society and worthy of the franchise.

We cannot devote the space necessary to a more extended review of our national history to illustrate the variety and extent of the preliminary educational experience that has prepared this country for the expansion so unexpectedly thrust upon it. But the foregoing will sufficiently indicate why we have no fears as to the result. Without anticipating the results of the Conference now in session at Paris we may express our confidence that the destinies of every territory intrusted to the care of this nation by that Conference will be so directed as will result in the happiness and prosperity of its inhabitants, in greater dignity and influence for this country, and in larger opportunities for commerce for the whole world. The "commencement" to which the speaker we have quoted referred is one that is full of promise for all.

### THE FUTURE OF CHINA.

THE events that are now following one another so swiftly in the great Middle Kingdom seem strangely incongruous in these closing days of the nineteenth century. They belong rather to the times of Haroun al Raschid, Ali Baba and Aladdin. It is a strange fantasy of fate that the nation that for hundreds and even thousands of years has led so even and eventless an existence as almost to deserve the blessing that proverbially belongs to the nation without a history should at last have begun to move at such express-like speed that it is difficult for the observer situated at a distance from the scene of events to keep track of their progress, much less mark their significance and tendency. The short four years that have elapsed since the battle of the Yaloo have seen changes in the Flowery Kingdom that many cycles of the old Cathay would hardly parallel.

What the future will bring forth it is idle to attempt to prophesy, but it is clear that events have already carried the vast but headless Empire far beyond the point where it is able of itself to stem the tide. The destinies of China now rest in other hands than those of the Chinese. Dramatic as they are, the intrigues of the Empress Dowager and the unfortunate Emperor will have but little influence upon the final outcome. The real forces that are to influence and ultimately control the situation are the warships that under various flags are



silently closing in around the distressed and agitated Empire. The real struggle that will decide the future, not of China alone but of the entire East, will be fought in the diplomatic Cabinets of the interested Powers.

Underlying the impending battle of diplomacy and the possible display of armed force accompanying it, the great and dominant factor is unquestionably Trade. The civilized world sees in China commercial and industrial possibilities in comparison with which the wealth and importance of the Indies, that for a thousand years fired the imaginations and stimulated the energies of mankind, are but secondary. Nor are these sanguine anticipations wholly without foundation. Several notable concessions recently granted give us an adequate idea of the greatness of the stake for which the diplomats of Caucasian civilization are playing. The most important of these was the Shansi Concession, which was signed on May 21 of the present year in the presence of the Tsungli Yamen and verified and ratified by the British and Italian ministers to China. This contract ceded to the Pekin Syndicate of London the sole right to open and work the coal and iron deposits of central and southern Shansi and the petroleum deposits of the entire province; also the right to construct and operate all necessary railways to main trunk lines and navigable waters for exporting the mining products. The epoch-making feature of this concession is that it marks an important change in the industrial policy of China, and establishes a precedent of allowing foreigners, for commercial purposes, to own real estate in the interior of China, open and operate mines and construct and maintain railways.

The province of Shansi lies to the west of Chihli. It consists of an interior plateau of 3,000 feet elevation, more or less cut up by rivers. In the eastern portion of the province and running into the Province of Honan are deposits of anthracite coal. The western half has bituminous coal covering some 12,000 square miles, and all along the western boundary are deposits of petroleum. At many points in the coal region are deposits of rich iron ore. In the judgment of the American Consul at Tientsin there is probably no coal field known in the world that can compare with this of Shansi, either in quality or quantity of coal or the possibility of cheap production. In addition to the concession in Shansi the Pekin Syndicate secured on the 21st of June a similar agreement ceding all of the Province of Honan north of the Yellow River, about 10,000 square miles, and all of the mountainous part of the same province south of the Yellow River. The total area of these concessions is 71,000 square miles, equal to the area of England and Scotland.

The coal and iron of this vast region have been known and worked on a comparatively insignificant scale for thousands of years. According to the Chinese tradition it was here that the properties of iron were accidentally discovered by the Emperor Fuh-he, who reigned from B. C. 2953 to 2838, through having burnt a quantity of wood on a brown earth. Baron von Richthofen, the greatest authority on the mineral wealth of China, states that the iron is of great purity and easily fused, and that, moreover, the clay and sand for crucibles and a very superior anthracite coal lie close at hand. As to the richness of the coal fields in this region, the same authority is of the opinion that at the present rate of consumption the whole world could be supplied for thousands of years from Shansi alone. The fact that the great beds are horizontal and at a considerable elevation led him to add that it would probably be found feasible to construct branch railways actually within the body of the beds, the tunnels extending for miles beneath the hills. This would allow the products of the beds to be put directly on railway cars intended for distant places.

These facts are sufficient to indicate that there is abundant foundation for the belief that the twentieth century will see in China an industrial development the like of which the world has never seen. The teeming masses of the native population supply an abundance of labor that properly directed is highly efficient. Under wise and enlightened government the influx of foreign capital and administrative skill will create in China a vast market for merchandise of a thousand kinds. The problem to be solved during the remaining months of the nineteenth century is to determine and establish such a government. The mere partition of the Empire would be a most unsatisfactory solution. In that event no one of the despoiling States would give the slightest guarantee that its portion would be developed in the interest of any one but its own politicians and military satraps, or, indeed, that it would be developed at all.

Beyond question the outcome most to be desired is a government under the guarantee and protection of the several interested Powers, but not dominated by any one to the prejudice of all, that shall give to the natives security and liberty to live as heretofore, in accordance with their traditions, and at the same time shall grant to all foreigners such protection and freedom as will enable them to develop the vast latent resources of the country in a manner to meet the industrial and commercial demands of the future.

It is gratifying to note the vigor and promptness with which Mr. Hay on assuming the portfolio of the Secretary of State has caused a suitable American naval force to join the squadrons of the other Powers at Tientsin. The commercial greatness of this country in the twentieth century demands that our diplomats insist most strenuously upon the policy of the "Open Door" in China to-day.

#### GRAIN PRICES AND CHEAP RAILWAY CONSTRUCTION AND OPERATION.

THE whole world is interested in the long distance transportation problems that have been faced and solved in the United States during the past thirty years, for two reasons. First, because their solution directly affects the price of food the world over, the fact that most of the American grain fields are far in the interior rendering the price of their products to the consumer dependent very largely upon the cost of transportation to the seaboard. Second, because in all new countries, and in all countries of extensive area, whether new or old, the transportation methods that have proved successful in America are more than likely to prove successful too.

For the present we must ask the reader's attention to the former of these reasons, leaving the other for later consideration. Fortunately the point under discussion is capable of absolute proof. In 1867 the railroads carried 5.77 bushels of wheat from Chicago to New York for the price of one. In 1870 they carried 7.54 bushels for the market price of one, showing that the price of freight was falling much faster than was the price of the grain itself. In 1877 the amount of wheat carried for the price of a bushel had further increased to 10.41 bushels. In 1885 it was 14.65, and in 1897 it was no less than 17.24. The statistics on this point are not yet available for 1898, but there can be no doubt that there was a still further increase owing to the greater price of grain.

A similar state of affairs exists with reference to every other grain, and to agricultural produce generally. The progress has been even more rapid of late than during the earlier years of the period under consideration. The railroad ton-mile rate on wheat between Chicago and New York, for example, has been cut in half since 1886, falling from 8.71 cents to 4.35 cents. The fall in the transportation rate for



coal and iron ore has been even more striking, but does not fall properly under the head of this article.

Nothing can be clearer than that the transportation system which accomplishes such results as these is worthy of serious study. The combination of steel rails, locomotives, freight cars and the thousand other articles of manufacture that make up the railway systems that enable wheat grown 2,000 miles from the seaboard to be not only marketed there at a profit but exported at a profit is certainly notable. The rapidly increasing export demand for American steel rails and other material for railway construction, including steel bridges, locomotives and cars, indicates that foreign buyers are alive to these facts.

### AMERICAN WRITING MACHINES.

IT is hardly two decades since the industry of manufacturing writing machines first began to take an important place among American enterprises. At first, like many other great inventions, there was a steady call for the money of those who had faith in the ultimate success of the typewriter, but very little sale for the machines themselves. The public had to be educated to the idea of doing away entirely with the pen that for centuries had reigned undisputed as the chief instrument of chirography. The inventors of the earliest machines and the little groups of capitalists who supported them could hardly have anticipated, even in their most sanguine dreams, that the click of the American typewriter would come to be heard around the world, and that operators in every clime and of scores of languages would operate its keys.

In the light of what has actually happened it is unusually interesting to read the following account of the experience of one of the first users of what was destined to become an instrument of such universally recognized value. The fact that the events he describes occurred no longer ago than 1872 furnishes in itself a striking commentary on the rapidity with which a great invention is perfected and wins its way into general acceptance in the United States. We take the story from a letter written by S. N. D. North to the columns of the *New York Sun*.

While managing editor of the *Utica Morning Herald*, I was suddenly afflicted with a trouble with my eyes which forbade either reading or writing, and seemed to put an end to my hope of making a livelihood in the newspaper profession. One day a friend informed me that a factory hardly fifteen miles distant was at work upon a writing machine which he thought might help me. I took the first train and found them busy upon experimental machines, not yet ready for the market, one of which they were finally persuaded to ship to Utica for my trial through the intervention of a college classmate then employed in the business office and since a member of the firm.

This machine was clumsy and cumbersome in comparison with the delicate mechanism of to-day, but the principle of the construction was essentially the same, except that the carriage, instead of being restored to position by the hand, at the end of each line as now, was brought back by means of a foot pedal, and it came with a jar that made the machine tremble in every part. My machine did neither elegant nor uniform work, but after a week or two I was enabled to accomplish all my editorial work upon it, and I began to realize dimly what an unspeakable boon to all weak-eyed persons lay here in embryo. As the makers improved the machine they sent me others to take the place of that first crude instrument, and soon it was regularly on the market.

I have often wished since that I had kept that original machine, for it would have illustrated better than any mechanism with which I am familiar the marvellous rapidity with which American ingenuity advances to the point of perfection any labor-saving instrument the underlying principle of which has been successfully worked out. Next to the sewing machine, as a device for lightening the labor of the toiling millions, the typewriter undoubtedly stands.

From these early and clumsy beginnings the progress of invention has been little short of the marvellous. One concern followed another in this field, until to-day there are in

the United States nearly a score of houses engaged in manufacturing this specialty alone. The rivalry and competition have been so keen that each has been spurred from one great improvement to another, until the outsider, whose only task is to watch the operator whose flying fingers speed over the keys, can scarcely conceive of any direction along which further progress would be possible.

A similar and no less striking advance has taken place in public opinion with reference to the typewriter. At first it was looked at askance by even the most intelligent members of the community as at best only an ingenious toy. The appearance of the typewritten page in correspondence was not always hailed as a relief from the task of deciphering the hieroglyphics of careless correspondents. We well remember one occasion on which a friend, who was a country clergyman, received a scathing answer from one of his parishioners in answer to a neatly typewritten personal invitation to attend some social event at the clergyman's house. The good deacon was highly incensed at receiving what he regarded as a printed circular, and vowed that if his minister didn't care enough for his presence to write him a letter he could go without it.

Even after this general ignorance of the typewriter and its work wore away there still remained something of a prejudice against the machine on account of the uneven appearance of its work. The progress of invention quickly disposed of this difficulty. Slowly but steadily the machine made its way, until at present it is simply a necessity of all business offices. In the great office buildings that tower above the streets of down-town New York there is hardly a room where the merry click of the instrument is not heard, scores and sometimes hundreds being used in every block.

Abroad, the same gradual and steady process of adoption is observable. Four years ago the machine was all but unknown on the Continent, and only occasionally used even in Great Britain. The export statistics printed on another page give a better picture than can be conveyed by words of the progress that has taken place since then. The fact that machines are now made with lettering adapted to nearly every language in general use in the commercial world renders it available to every one, no matter where situated. For commission merchants, both importing and exporting, the instrument is well-nigh indispensable, since misunderstandings through misreading handwriting in a foreign tongue are so frequent. A house whose business is only moderate should easily save the price of a machine in this way alone in a single year, not to mention the indication of progressiveness that the use of this up-to-date instrument carries with it.

### THE GLASGOW CAST-IRON-PIPE CONTRACT.

ON another page we reprint from the *Iron and Steel Trades Review* a very interesting account of the struggle for a cast-iron-pipe contract recently awarded by the Glasgow water-works. There has been so much discussion regarding this contract and so many contradictory statements have been made that our readers will welcome this clear, dispassionate and authoritative statement of the case.

This now celebrated contract struggle should be highly suggestive to every alert commission merchant. In hundreds of localities there are rings and combinations that succeed in obtaining, not only from public bodies but from private individuals as well, prices that are generally in excess of what they would be under unrestrained competition. This is the case with a great variety of products, yet there are but few lines



to-day where an enterprising and energetic commission merchant could not institute an opposition that would be both formidable and, as in the Glasgow instance, welcome. It is needless to say that in the case of large contracts the profits of such action would often be considerable.

We cannot too often repeat that modern industrial progress, if it has not annihilated space, has at least risen superior to it. Be the impending contract in Odessa, Valparaiso or Johannesburg, it would find New York and Chicago competing with Sheffield and Brussels. Every importing commission merchant in whose vicinity important contracts, public or private, are pending should take steps to inform strong manufacturers of the class interested in other lands. As their local representative he would profit by their success and lose nothing should they not succeed at first. The advertising pages of THE AMERICAN EXPORTER give the names of reliable manufacturers in a great variety of lines. The publishers of the paper will promptly furnish the names of the best manufacturers in any line not represented or give any other assistance in their power to readers desirous of instituting American competition in any contract impending in their locality.

### THE WORLD'S SUPPLY OF WHEAT.

UNTIL within very recent times the world has been content to accept such well-nigh universal disasters as famine and plague as visitations of the Almighty, or at all events, as events resulting from causes of such magnitude that resistance was not to be thought of. Suffering humanity could only bow to the inevitable—or flee. Death stalked abroad, and feeble man could only submit to his resistless sway.

To-day the progress of science and the advance of general knowledge have taught us that blind submission to these grim fates is unnecessary. Even in India, where, for countless centuries, pestilence has claimed its own with fearful regularity, the enlightened government of the English has already won a certain degree of immunity, and bids fair in another generation to stamp out the germs of the destroyer. Throughout the world the progress of civilization has rendered famines, of even comparatively local extent, increasingly rare.

This satisfactory progress, when we compare the conditions of to-day with those prevailing in the past, does not, however, alter the fact that the greatest problem confronting the civilized world is that of subsistence. Such matters as "Balance of Power," "International Armaments," and the like, are insignificant compared to this. The most important munition of war is, and always will be, food. It is no less indispensable in peace. And the most important element in the food problem is, for civilized nations, that the solution of which depends upon the world's supply of wheat.

Sir William Crooke, in his recent presidential address before the British Association, at Bristol, pointed out that wheat is the most sustaining food grain of the great Caucasian race, which includes the peoples of Europe, United States, Canada, and the white population of South Africa, Australasia, South America, and the many European colonies. More than this, the individual consumption of wheat has almost universally increased. In Scandinavia it has risen 100 per cent. in twenty-five years; in Austro-Hungary, 80 per cent.; in France, 20, and in Belgium, 50 per cent. In 1871 the bread eaters of the world numbered 371,000,000. In 1881 the numbers rose to 416,000,000; in 1891 to 472,600,000, and at the present time they number 516,500,000. The augmentation of the world's bread-eating population in

a geometrical ratio is evidenced by the fact that the yearly aggregates grow progressively larger. In the early seventies they rose 4,300,000 per annum, while in the eighties they increased by more than 6,000,000 per annum, necessitating annual additions to the bread supply nearly one-half greater than sufficed twenty-five years ago.

To supply 516,500,000 bread eaters, if each were to have a normal ration, would require a total of 2,324,000,000 bushels. The total supplies from the 1897-98 harvest aggregated, according to the best authorities, 1,921,000,000 bushels. Sir William Crooke, who advances these figures, explains this deficit of 403,000,000 bushels by pointing to the disappearance of the surplus of over 300,000,000 that existed at the commencement of the present year. He concludes that the areas under wheat cultivation can be increased sufficiently to cover both this increase in the number of bread eaters and the normal increase of population for some thirty or forty years more. Then he prophesies that the limit will have been reached, and suffering humanity will depend upon chemistry, or a famine and pestilence, to give relief.

For our own part we cannot but feel that, with all deference to the views of the distinguished statistician, there are many elements in the problem on which statistics can throw no light. Sir William himself suggests that chemistry may teach the progressive farmer to vastly increase the yields of wheat per acre. Railroads and canals vastly increase the area available for cultivation. Nor have travellers and geographers as yet said the last word regarding the possibilities of unfamiliar regions for wheat cultivation. At one time, the text-books on geography contained maps on which the entire region west of the Mississippi River was marked "Great American Desert." That region is now the wheat belt of America.

The great gain for the future will come through the adoption of progressive methods of agriculture, not only wherever wheat is raised, but where any agricultural operations are carried on. In Russia to-day we understand that from four to eight bushels of wheat per acre is considered a good yield, and the average falls nearer the former figure than the latter. The average the world over is 12.7 bushels, and in the United States it is higher than that, and in Great Britain, Denmark, and other countries in Northern Europe where cultivation is very high, it is very much higher. In many parts of the world the average yield per acre falls as low as three or four bushels.

In the case of the lowest yields, we find that the processes employed are very crude. In some instances peasants merely scratched the ground with a stick instead of plowing. In the case of the highest yields, as in Great Britain, operations are very elaborate and usually highly scientific. We believe that for practical purposes in the case of wheat, the best solution of the problem lies between these two. The American system of cultivating large acres with as little labor as possible results in a fairly large production at a sufficiently low average expense to enable the crop to be shipped enormous distances and still be sold at a profit. The day of small farmers has forever passed, except in limited localities and under exceptional conditions. At most, it offers a precarious and stunted livelihood, except for those who grow produce for large cities. Wheat, to be profitable, must be grown in large quantities.

The large wheat grower the world over labors under very similar conditions. The price of the commodity is the same everywhere. Chicago and London fix that for the world. Odessa competes with Duluth, Bombay with Buenos Ayres. The intelligent wheat grower should then be thor-



oughly alive to the best methods and appliances in use, not only in his vicinity or country, but anywhere in the world. He should study modern fertilization and drainage. He should also study modern labor-saving machinery. Here in America labor is dispensed with in masses at every operation, from preparing the soil for seed sowing to harvesting and threshing the crop. Each machine in use represents years of study and invention, years of rivalry and test on the wheat field. Those now in use represent the survivals of the fiercest competition imaginable. The foreign buyer who comes to this country can feel assured that what is offered him is not experimental, but of demonstrated merit and success. And whether he purposes to buy here or not, he will certainly do well to investigate this market, if only to assure himself that whatever he may buy elsewhere will be worthy to compete with the similar articles on the fields of his rivals and competitors that will carry the brand "Made in America."

Governments will do well to abandon their costly military armaments and send their soldiers into the wheat fields. Should they do so, or even if they should conclude to foster wheat production only to the extent of favoring more progressive methods and appliances, they would doubtless not ignore the great factories to the west of the Atlantic, whence so much of the world's best wheat growers' machinery emanates.

### THE FALL OF OMDURMAN.

THE gruesome tale of the slaughter of 12,000 or 15,000 fanatic dervishes in their last stand before the capital of Mahdism against the steady advance of the Anglo-Egyptian forces under the Sirdar leaves the reader almost undecided whether to rejoice or lament. For the fearful loss of heroic lives the harshest enemy of blind fanaticism cannot withhold the tribute of a sincere sorrow. Greater devotion, greater bravery no army ever showed, could ever show, than that displayed by the white-clad Baggara as they rushed against the lines of flame and leaden and iron death.

No event in contemporary history illustrates more vividly and more tragically the immeasurable superiority of civilization over barbarism. The following brief extract from G. W. Stevens's account of the battle in the London *Daily Mail* reveals in a paragraph the greatness of the inequality:

The line of flags swung forward and a mass of white flying linen swung forward with it, too. They came very fast and they came very straight; and then presently they came no further. With a crash the bullets leaped out of the British rifles. It began with the Guards and Warwicks—section volleys at 2,000 yards; then as the Dervishes edged rightward it ran along to the Highlanders, the Lincolns and to Maxwell's Brigade. The British stood up in double rank behind their zariba; the blacks lay down in their shelter trench; both poured out death as fast as they could load and press trigger. Shrapnel whistled and Maxims growled savagely. From all the line came perpetual fire, fire, fire, and shrieked forth great gusts of destruction.

And the enemy? No white trooper would have faced that torrent of death for five minutes, but the Baggara and the blacks came on. The torrents swept into them and hurled them down in whole companies. You saw a rigid line gather itself up and rush on evenly; then before a shrapnel shell or a Maxim the line suddenly quivered and stopped. The line was yet unbroken, but it was quite still.

Nothing, certainly, could be more hopeless than this heroic yet utterly fruitless charge. It was modern science against mediæval bravery, and science won. And, when we consider the result, the world, and especially the commercial world, cannot but rejoice that the savage and ignorant fanaticism that destroyed Gordon and made Khartoum a part of the desert is flying, defeated and broken, into the interior. While it had sway the upper Nile and the Soudan were practically blotted out. The victory of General Kitchener restores them to the service of civilization.

### WHERE THE AMERICAN TYPEWRITERS EXPORTED GO.

IT is a matter of same importance to the manufacturer of a given article to ascertain, at least, in a general way, where the best demand for his goods exists and reversely where it is scarcely worth his while to seek a market. Similarly such information should be of value to importing commission houses. It is pretty safe to say that people whose general characteristics are the same will approve of and buy similar articles. If a commission merchant notes that an article of general use is purchased in considerable amounts by people whose tastes and habits are practically identical with those in his own locality he will do well to inquire whether a sale for that article could not be built up there. In this way many of the great "hits" in international trade are scored.

It is for their suggestiveness along these lines that we print from time to time in THE AMERICAN EXPORTER such tables of statistics as follows. The figures tell their own story and we shall only remark in connection with them that the same satisfactory increase has been maintained for the months of July, August and September that is here indicated. In other words, the records of exports for those three months that were made a year ago, which broke all previous records up to that time, have been again broken for each month in succession, so the following showing of exports for the fiscal year ending June 30, 1898, is almost certain to be surpassed by that for the fiscal year ending the same day, 1899:

EXPORTS OF AMERICAN TYPEWRITING MACHINES AND PARTS OF FOR THE FISCAL YEAR ENDING JUNE 30.

	1897.	1898.
United Kingdom.....	731,152	896,575
France.....	99,222	94,608
Germany.....	228,710	425,614
Other Europe.....	175,976	232,253
British North America.....	30,710	51,752
Central American States and British Honduras..	13,270	2,360
Mexico.....	25,298	28,900
Santo Domingo.....	267	90
Cuba.....	2,745	1,457
Puerto Rico.....	590	65
Other West Indies and Bermuda.....	5,540	4,225
Argentina.....	11,914	18,187
Brazil.....	4,006	4,945
Colombia.....	3,995	4,228
Other South America.....	11,278	14,652
China.....	3,672	2,642
East Indies: British.....	7,608	9,014
Japan.....	4,858	4,220
British Australasia.....	67,622	60,039
Other Asia and Oceanica.....	5,062	9,985
Africa.....	19,622	36,342
Total.....	1,453,117	1,902,153

IT is pleasant to be able to chronicle two somewhat notable triumphs for American manufacturers during the past month. The first of these is the completion of what is said to be the first locomotive built in this country on strictly American lines for use in Great Britain. We believe that a few American built locomotives are running in the United Kingdom, but they are all of the English type. The machine that is now going over is a "double tender" and will run between Barnstaple, in Devonshire, and Lynton. We trust that it will impress English railroad men so favorably as to be the first of a long series. The handsome American type of locomotive is now familiar in almost every country in the world, and is winning its way upon its merits.

The other industrial event to which we alluded in the preceding paragraph is the purchase in this country, by representatives of the Chinese Government, of a complete electric-power equipment designed to be installed in a woollen mill at Tientsin. It is interesting to note that the engines and wool machinery were also ordered over here. Any electric installation in the Flowery Kingdom would be interesting. The fact that the first to be made under native auspices comes from America makes it doubly so.



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TWO NEW MODELS—Nos. 5 and 6.



THE AMERICAN WRITING MACHINE COMPANY takes pleasure in presenting its new model. The splendid record of the past eighteen years is coupled in the name with a hint of the high ideal for the future. The "New Century Caligraph" represents the highest point in typewriter quality and equipment, and it will be kept fully up to the standard of its name as the years pass. It will merit a closer acquaintance.

The touch of the New Century is incomparably easy and elastic. Its work will satisfy the most exacting. Perfect alignment is permanently

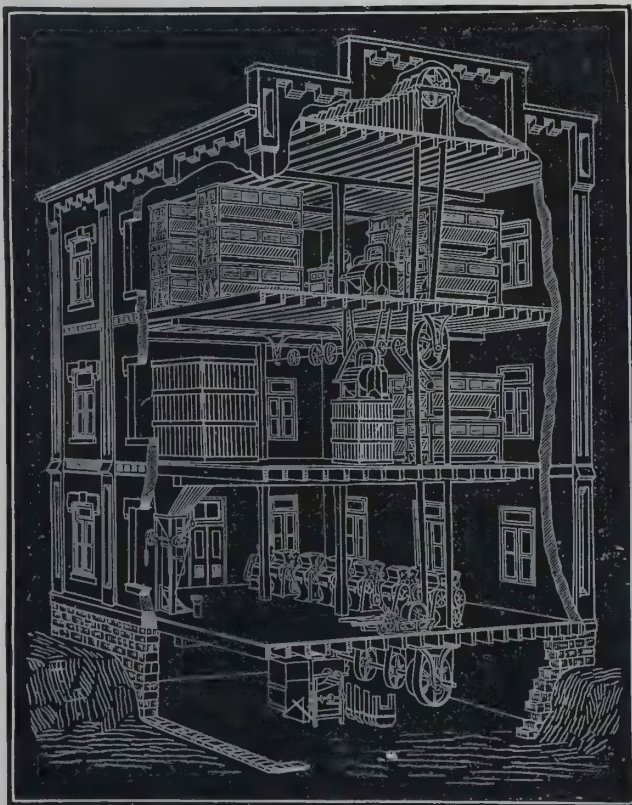
secured by correct mechanical conditions. Unsightly ups and downs in manifolding are entirely obviated by an ingenious device, and any number of manifold copies can be easily inserted. The action throughout is so nicely balanced that the noise of operation is reduced to the minimum. The ribbon movement is automatic. Provision is made for writing on ruled forms; single, double or triple line spacing; mimeographing without removing the ribbon; locking keys at any point and also at the end of the line; and releasing the carriage in any position.

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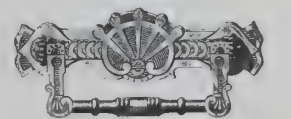
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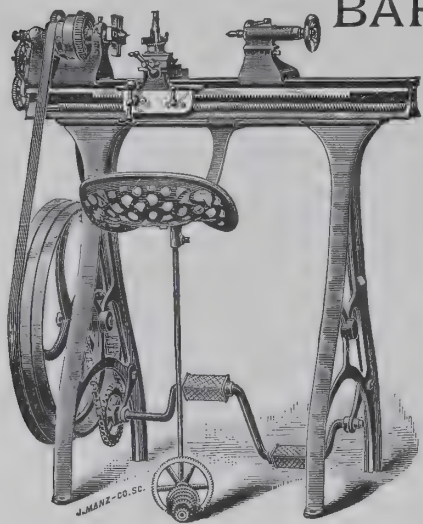


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SCROLL SAWS, CIRCULAR SAWS, LATHES, MORTISES,  
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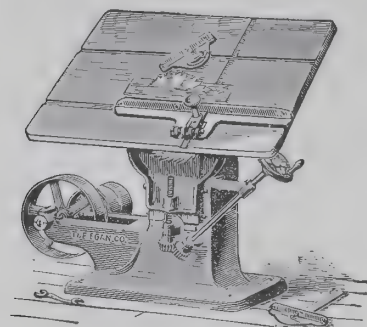
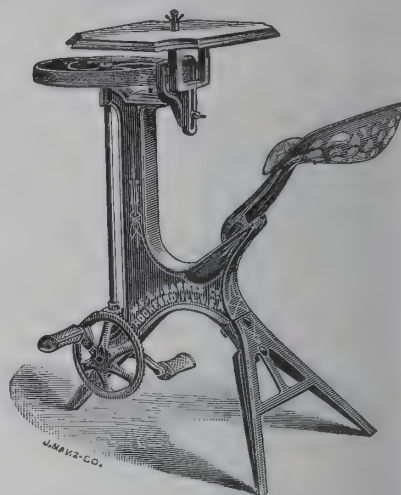
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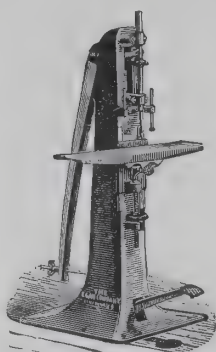
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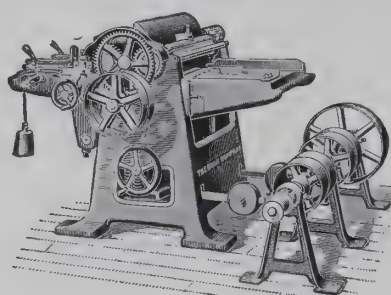
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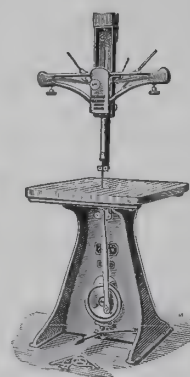
No. 1 Variety Saw.



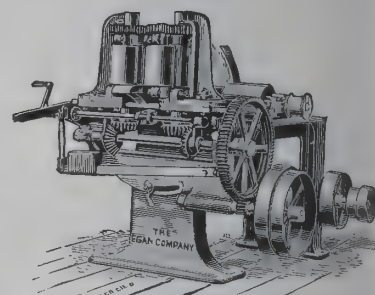
Foot Mortiser.



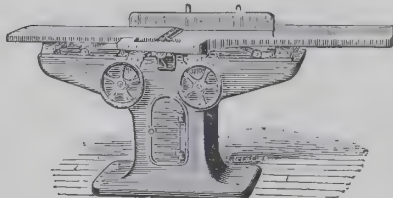
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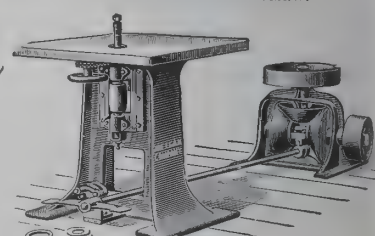


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### The Glasgow Cast-Iron Pipe Contract.

AN interesting review of the struggle for an order of cast-iron pipe for the Glasgow Waterworks is published in the *Iron and Steel Trades Journal* just received. Our contemporary says: "Last week we stated incorrectly that the Glasgow Waterworks Committee had awarded their contract for 1,000 tons of pipes to Robert Maclaren & Co. Had the statement been that the committee had agreed to recommend the Town Council to accept the Maclaren & Co. offer, it would have been accurate. On Friday, at the ordinary midmonthly meeting of the Glasgow corporation, the recommendation of the Water Committee on this matter was considered, and by 39 votes to 21 it was decided to give R. Maclaren & Co. the order for pipes from 3 to 6 inch diameter, and to place with R. D. Wood & Co., of Philadelphia, the contract for the 7 to 12 inch pipes. Surrounding this latest example of American competition there are some circumstances to be considered before we conclude that in Glasgow iron pipes cannot be produced as cheaply as in Philadelphia. In response to their advertisement the Waterworks Committee on July 9th opened tenders for 1,000 tons of pipes. Only four tenders were received—R. Maclaren & Co. averaging £5 13s. 5d. per ton; Robert Laidlaw & Son, £5 18s. 3d.; D. Y. Stewart & Co., £5 19s. 10d., and H. R. Merton & Co., of London, on behalf of R. D. Wood & Co., Philadelphia, £4 19s. 10d. Mr. Gale, the waterworks engineer, had specified for 9-foot lengths, but Wood & Co.'s tender was for 12-foot lengths, otherwise there is no doubt the contract would at once have gone to the American founders, whose tender was £675 13s., or 13s. 6d. per ton below that of Maclaren & Co., the next lowest tender. The engineer advised that 12-foot pipes would be as suitable as the shorter lengths, but to prevent any complaint from the representatives of local industry it was decided to again invite offers, giving tenderers the option of quoting for both lengths. On August 6th the second tenders were opened, the same firms competing. Wood & Co. had reduced their price 1s. 6d. per ton, Maclaren & Co. 14s. 1d., Laidlaw & Son 10s., and D. Y. Stewart & Co. 10s. In the second try Maclaren & Co. dropped their price so as to bring it just 2d. per ton under the original American offer, evidently assuming that Wood's first tender would not be altered, but in the second tender, just as an experiment, 1s. 6d. per ton had been struck off, and it was a very successful experiment, as Maclaren & Co. were again second best, not this time by 13s. 7d. per ton, but 1s. 4d. per ton. On the Waterworks Committee opinion was so evenly divided that the chairman's casting vote decided whether the Scotch or American tender should be accepted, but the corporation, by a majority of nearly two to one, ignored the committee's recommendation and dealt with the contract in their own way. Alexander Brown, whose amendment disposing of the matter was adopted, made some remarkable statements as to the peculiar conditions under which the corporation supplies of castings had been obtained of recent years, and it was to give an object lesson as to the new element in competition, as well as in justice to the American tenderers, that the contract was divided. Mr. Brown stated that for years the waterworks officials considered that there was no real competition for their contracts; tenders were sent in by the various firms, but each in turn made the lowest offer, and in remarkable rotation each foundry took the order. More than this, it was believed that the Glasgow corporation had to pay sometimes 10s. per ton more for pipes than the Edinburgh authorities. In 1893 an effort was made to get supplies outside the Glasgow 'ring,' and a Stockton or Middlesborough firm were invited to tender. This firm tendered for two years, and during this period there was a notable drop in the Scotch founders' prices, followed by the withdrawal of North of England competition. 'In some way or other,' said Mr. Brown, 'this firm disappeared from the scene and refused to tender any more.' These competitors for the Glasgow corporation business having by arrangement or otherwise withdrawn, the next contract had to be placed at 58s. 3½d. per ton, an advance from 45s. 4½d., and since then 74s. 6d. has been paid. The main point of the argument in favor of accepting the offer of American pipes was that while the Scotch pipe founders seemed to arrange the disposal of the contract among themselves, and agreeing that

R. Maclaren & Co. were either most deserving or most in need of the order, this firm put in what was supposed to be the lowest tender, quoting £5 13s. 5d. per ton for pipes, while subsequent events show they considered £4 19s. 8d. a reasonable price. Rightly or wrongly, the impression conveyed by the two sets of tenders is that in July the Scotch firms expected no competition, and put up their prices accordingly. The Glasgow corporation welcomes the new element, but, apart from this, it would have been a ridiculous proceeding when the Philadelphia firm had twice sent in the lowest tender to have ignored their moral right to the contract. We have it on the authority of Mr. Foulis, the Glasgow Gasworks engineer, that R. D. Wood & Co., of Philadelphia, have supplied his department with many hundreds of tons of pipes of most excellent quality and satisfactory in every way. According to Mr. Brown and other members of the Council, the Scotch pipe founders have had the Water Committee under the whiphand in the matter of pipe contracts for years, and it would have been under these circumstances stupid ingratitude to ignore the offer of deliverance, even though it comes from a Philadelphia foundry. If the 'ring' is broken, and the Glasgow foundries compete against each other, we shall be surprised if any outsiders can successfully compete against them for work to be delivered in their own district. The very latest information regarding the much advertised contract is that R. Maclaren & Co. have written to the Water Committee declining to supply the pipes allotted to them unless allowed an additional 13s. per ton. Maclaren & Co. profess that they are entitled to the whole contract or they are not bound to undertake a part of it. Probably the matter will end in R. D. Wood & Co. accepting the whole of the order."

### The Age of Steel and Its Duration.

IN an article on "Bridge Construction" in *The Engineering Magazine* (September), Gustav Lindenthal gives this name to the present industrial epoch, and predicts that, glorious though it may be, it will be very short. He says: "In all probability the steel age will be the shortest in history. It will end at a time, perhaps, no farther removed from the present than the present is from the time of the Crusades. In Europe and America, at least, steel bridges will be then creations of the past. This will be so, because, for the production of steel and iron in large masses, fuel in large quantities is necessary. Charcoal was the exclusive fuel and reducing agent before mineral coal was used. Once the mineral fuels (coal, petroleum, natural gas, or their products) are exhausted, the production of iron must revert to the limitations of the charcoal period. Authorities estimate that the coalfields of Europe and America will last from four hundred to fifteen hundred years longer. Those of Asia and Africa are not yet fully known. Measured by the age of the Egyptian pyramids the steel age will, therefore, be of short duration, but the most glorious in the history of mankind. The expectation that progress in the sciences will discover new ways of making iron and steel in large masses without fuel, or with very little fuel, cannot be fulfilled. Power for mechanical purposes mankind will be able to obtain from the four other great sources of nature (wind, tide, waterfalls and the heat of the sun), but mineral fuel is the only great source of power which can also be used for the reduction of iron ores. Once gone, it cannot be replaced or reproduced. Moreover, the development and most extensive use of the four other sources of power cannot be achieved without metals, and, foremost, without iron and steel for the necessary appliances, machinery and structures. Without coal, no iron and steel; without iron and steel in great masses, no great machinery for utilizing the sources of power."

The foregoing is interesting in connection with the editorial on "The Future of China," on another page, where some recently ascertained facts regarding the coalfields of that part of Asia are presented. It will be noticed that the fulfillment of this prophecy is placed nearly a thousand years away. We have only to ask ourselves whether any contemporary of the Crusaders could have foreseen the industrial development of the Age of Steel to perceive how idle such speculations are.

**Trolleys in Ireland.**—The American trolley is being introduced in Ireland. The system of the Dublin United Tramways, formerly operated by horse-power, is being converted into electrical traction. The first section completed is the Clontarf line, extending from Dublin through the suburbs, a total distance of about 6 miles. On this section, the introduction of the trolley was signalized by a reduction of fares to a trifle more than half what they had been. Notwithstanding this reduction, the receipts increased 38 per cent., while working expenses were reduced from 71.76 per cent. with horse-power to 47.09 per cent. under electrical traction.



### Increasing Use of Structural Steel.

THE daily press has recently noted the fact that steel is now being used not only in the great business buildings which crowd our large cities but it is being put in structures of smaller dimensions. A Philadelphia paper, in a recent issue, stated that there is now in course of construction near that city a splendid country seat, which is remarkable for its size, location and architectural beauty, and especially notable from the fact that it is being built of iron and steel beams, such as are used in the immense business structures of the period.

The fact is, structural steel, such as beams and angles, is already being used in buildings of far less cost than "splendid country seats." The ordinary stone front found in the residence portion of the average city now requires steel, and the smaller business houses are being constructed largely of that material. Prices of structural steel have been cut down materially within the last few years, consequently its use must extend. As sheet metal has in the construction of factory buildings displaced wood, so will steel beams be used in the place of more cumbersome timber. Moreover, the cost of heavy timber must increase, while the cost of steel will grow less. Long before the present structural shapes of steel were known to the building trade, steel rails were used for beams in many cases. It must be admitted that steel, even when unprotected, is as good a fire-resisting material as wood, and steel will each year encroach more and more upon the lumber trade. The time has hardly arrived when it can be used in the construction of small dwellings, but that time is fast approaching, and it is being hurried by the fire regulations in many cities. With improvements in turning out small structural shapes, the use of steel in the construction of small buildings will increase, and the next few years will undoubtedly see important changes in that line.

### Some Large American Railroad Stations.

IT is doubtful if the United States, usually so prodigal of big things, can lay claim to the possession of the largest railway station in the world. Our own impression is that several Continental passenger stations, not to mention several of the enormous London terminals, surpass most, if not all, of the great American stations in size. However, the following account of a few of the biggest ones will be interesting to many of our readers, some of whom may have passed through one or more of those mentioned.

The city of St. Louis now possesses the distinction of having the largest passenger railway station in the United States. It is 630 feet long and 600 feet wide, and has thirty tracks, enough to handle ten incoming and ten outgoing trains simultaneously. It is known as the Union Station, and the territory owned by the company operating it covers twenty-seven acres.

The city of Boston has the next to the largest station for passenger service in the country. The Union Station in Boston, on the North Side, has a length of 500 feet, a width of 460 feet, and twenty-three tracks.

Both of these huge stations are to be surpassed by the new Southern Union Station in Boston, upon which work was begun in January, 1897, and which is now nearing completion. It is designed to be the biggest railroad station in the United States. The walls are built, the steelwork is all in place, and the material is on the ground for the completion of the structure.

The length of the Southern Union Station in Boston is to be 710 feet, and the width 650 feet. When it is completed there are to be tracks for thirty trains, and the waiting-room is to be 265 feet long. The station is to be lighted by electricity, and there will be steam heat, a compressed air plant, ice-making machinery, ventilating apparatus and a car-heating plant, together with ten steam boilers and electric engines capable of furnishing 1,500 horse-power. The interior walls and ceilings of the Boston station are to be of white enamelled brick, and the roadbed of the tracks is to be laid on a concrete flooring which is water-tight.

The prominence of Boston as a railroad centre, as shown by the size of its passenger stations, must be a surprise to many, for the territory served by Boston is practically limited to New England, and in much of it there is very little growth of population. The city of Chicago, on the other hand, is entered by railroads representing a mileage of 90,000. Nearly 300 through and more than 600 local trains arrive there daily in the passenger service, and there are thirty-five companies having a terminus there; but the business is divided among eight stations, none of which is large enough to be compared with either of those in Boston. The Central Depot, so called, in Chicago, has an area of 150 by 600 feet, and is used by the Illinois Central, the Michigan Central and the Big Four roads. What is known as the Dear-

born Street Station is not so large, but it fills the requirements of eight railroads.

There are two very large railroad stations in Philadelphia—the Pennsylvania and the Reading. Of these the Reading is the longer and the Pennsylvania the broader; and as width rather than length regulates the number of trains that can be handled, the Pennsylvania station is practically the more serviceable.

The alterations now under way at the Grand Central Station in New York will enable the New York Central to be compared favorably with many other roads in respect to the passenger accommodations afforded.

### American Ingenuity as Shown in the Records of the Patent Office.

THE applications for patents during the year 1897 outran the record of any previous year, reaching the high-water mark of 215,000. Invention is certainly not on the decline, and the man with an idea and a model is in stronger evidence than ever. In no time in the history of the Patent Office has there been any sign of a marked relapse in inventive ingenuity—here and there perhaps a parenthesis—as in times of panic and trade stagnation; but, as a rule, each year as it comes along added recruits to the army that never halts in the march of progress. The following table marks the line of increase for each decade since 1840;

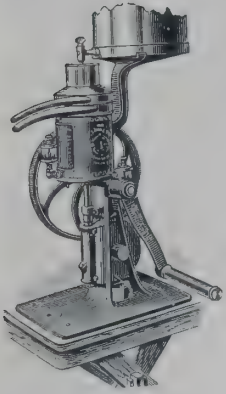
For 10 years beginning 1840 average is.....	1,186.9
For 10 years beginning 1850 average is.....	3,884.2
For 10 years beginning 1860 average is.....	11,724.5
For 10 years beginning 1870 average is.....	20,259.5
For 10 years beginning 1880 average is.....	33,443.9
For 8 years beginning 1890 average is.....	41,479.0

From the character of the patents granted and numbering 23,729 in 1897, says the *Age of Steel*, it is evident that the fertile mind of the inventor is fructifying in every field of endeavor. Ingenuity is not exclusive. It isolates nothing. It covers every imaginable form of device, and has its improving hand on every type of tool, machine, implement or apparatus helpful to industry or contributory to the comfort and convenience of human kind. In every annual report of the Commissioner of Patents we have a list of devices that are as diversified as was the population of Noah's Ark, and in the literature of ingenuity nothing more clearly demonstrates the ubiquitous character of inventive genius. It ranges from a shawl pin to a monster crane, and from a mouse trap or a lemon squeezer, to a tubular boiler, an electric motor, or a superb locomotive. It represents the democracy of genius in which nothing is too small to be important or too great to be unapproachable. Everything is its property. It pares a potato and shells peas and girds the planet with telegraph cables. The commonest and cheapest form of tool does not escape its improving hand, and it is equally as available in utilizing the epoch-making discoveries of science. It creates new industries, as in the case of the bicycle, the telephone, electrical appliances, linotype machines, etc. As it has been doing it will continue to do, keeping pace with discovery and declaring nothing as unimprovable that man has devised or constructed. In war as in peace it is equally potential and irrepressible. It plans arms of precision and propels explosives under the waters and above them, conceives and fashions a murderous pellet of lead and gives the surgeon a Roentgen ray by which the bullet can be located and life be spared.

In the list of patents granted in 1897 the bulk is divided between improvements on old devices and the utilization of new ideas. The nut lock, for instance, is honored with not less than 100 new patents; the common horseshoe with 66; the pump with 38, and the ubiquitous valve with 200 and more. Rivets have a claim on 21, and drills on 37. The wire stretcher has a record of 26, and the homely wrench is accountable for 74. The gas engine claims 58, and the steam boiler 52. Car couplings and fenders represent a host of patent seals, and bicycle and parts are piling patents without any chance of roofing them in. The saw and the wire nail machine, the chain and the conveyer, the radiator and the rotary engine, the lathe and the hoist, and even the voting machine to protect the sovereign voter from the usual pillage of his rights are all included in what may be termed practical patents. Nearly every State and Territory is represented in the issue of last year's patents, from Wyoming with a modest list of 6 to New York with a claim of 3,782. Forty-four foreign countries are also represented, from China with a claim of 2, to the United Kingdom with a list of 723. Egypt secured 1, and Germany 551. Mexico slated 9 and Canada 286.



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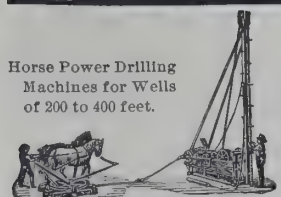
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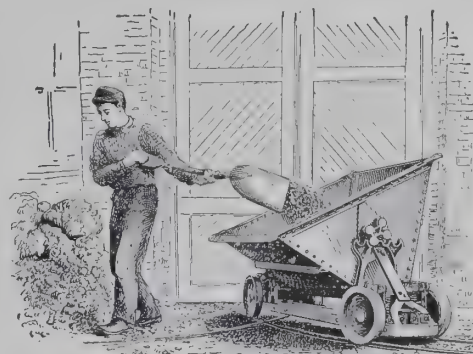
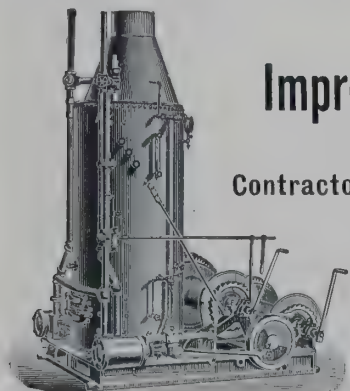
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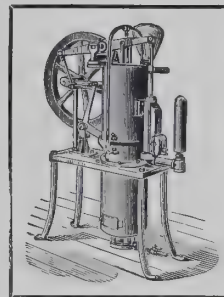
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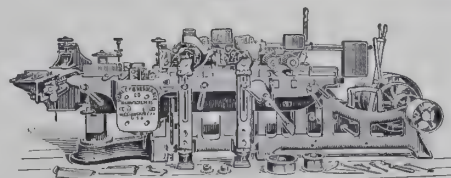
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### Sir Lowthian Bell's Prophecy.

A BOOK which has been almost forgotten, save by a few of the more pronounced bookworms among iron and steel manufacturers, is the special volume of "Proceedings of the Iron and Steel Institute of Great Britain in America in 1890," which was prepared by Sir Lowthian Bell. It is an exhaustive collection of statistical, geological, historical and industrial information relative to the American iron trade, made for the purpose principally of answering two questions, stated by Mr. Bell as follows: "How soon, if ever, will the New World dispense with all assistance from the Old in obtaining its necessary supplies of iron? And what further interval will elapse before we encounter large quantities of American iron in the neutral markets of the world?" In the light of the export achievements of American iron and steel manufacturers in the past two years, it is extremely interesting to refer to this book, now scarcely eight years old, and see how these questions were answered by one who was at that time regarded as almost the leading authority in great questions affecting the iron trade of the world.

In looking over the great mass of figures presented by Mr. Bell relative to cost of assembling raw material at blast furnaces, cost of pig iron at various producing centres, cost of steel rails at various works, etc., it is interesting to note how utterly valueless this information, largely drawn from Carroll D. Wright's reports, has so soon become. The country was just then approaching its revolutionary epoch in the production of iron and steel, but Mr. Bell did not know it, his exhaustive researches having made him no wiser than the American manufacturers who were then grappling with the living questions confronting them and letting the future take care of itself. After presenting a great array of figures of costs, Mr. Bell said: "It will be seen that the expense of bringing iron-making materials together in the United States constitutes a much more serious item in the cost of producing the crude metal than it is in Great Britain." To-day these conditions appear to be reversed, notwithstanding the very long distances which often intervene between raw materials in this country.

The most striking statement, however, is Mr. Bell's deduction relative to exports, which is as follows: "With regard to an export trade in iron from the United States, I think it very improbable that, beginning with pig iron at 53 shillings per ton at Pittsburg, and adding 8 shillings 4 pence for carriage to a seaport, the older seats of the American iron trade can compete with Great Britain except to countries close at hand, such as Canada and the northern portions of South America. If we are to meet American iron in Europe, Asia or Australia, it will be that produced in the Southern States of the Union." His "if" in regard to Southern iron has become a potential reality, while steel made in the "older seats" has become quite well known to consumers in the heart of England.—*The Iron Age*.

### American Iron in England.

THE English correspondent of *The Iron Age* has some interesting things to say of one of the peculiar features of the export trade in American pigs, a feature that is, happily, now passing away. He says: "In the early days of American competition in Great Britain, merchants selling 'Yankee' Iron were called upon to put some grade on the market which should be a compromise. American Iron had to be cheap, at least a half crown per ton below English Iron, and at the same time have some pretense to quality. Middlesboro No. 3 was supposed to be a representative English brand and in general use, and it puzzled exporters to find some grade of American Iron to go against it. They could not offer Northern Coke Irons, on account of prohibitive freights. They could not sell No. 2 or No. 1 Foundry Southern, because the price worked out too dear, delivered in England. A compromise was necessary, and No. 3 Foundry seemed to fill the bill. It could be laid down on quay, Liverpool or Manchester, cheaper than Middlesboro No. 3, and of course cheaper than good Scotch. The result was that No. 3 American came to be the standard grade. For a long time, and even yet, it was and is the only grade of American Iron known to the majority of buyers. Sellers at the outset found they could dispose of No. 3 because it was cheap. Buyers seized upon it with a tenacity that was both gratifying and ominous, for the time was sure to come when the faults of this particular grade would be discovered. The pioneer merchants fell into the lax and easy habit of offering No. 3 Southern Iron to all classes of consumers. It went indiscriminately into Textile and Cotton Machinery, Heavy Machinery, Casting Bed Plates, etc., Cast Iron Pipes; small jobbing concerns bought it to run into light Hardware castings; it was run into railway work,

as well as Lamp Brackets, Stoves—in fact, it ran the gamut of foundry work, small and large castings alike.

"The result may easily be imagined. Complaints began to come in fast. American Iron was 'too strong,' or 'too hard.' It would not tool, it was not hot enough, it was too sluggish. But the English consumer, through some fatal chance, got started on No. 3 Foundry, and he still sticks to No. 3 if he has not already become disgusted and ordered his buyer never again to bring a pig of Yankee Iron into his works.

"The great trouble with the export trade, until recently, has been that there was no intelligent selling. As I have said, No. 3 was offered ignorantly to every branch of the engineering and foundry trades as being 'as good as Middlesboro.' That was the catch phrase, and it went for a time. There was never any effort on the part of sellers to suit the grade to the wants of the consumer. Salesmen, as a rule, in England either know nothing of analyses, or, knowing, care little what they sell, if only they make a sale. English Irons do not sell on analysis. In fact, makers are loath to give out analyses, and it is a difficult matter to learn the chemical contents of English brands. As is well known, English pigs are not broken, only a few being fractured out of each cast, and the analysis of the whole cast is based on the grain of the few pigs broken.

"The chief characteristics of the native pigs, which compete with American Irons, are higher silicon and higher phosphorus and less metal. The result is a softer Iron, but at the same time a weaker Iron, due to the excessive phosphorus contents. English founders like a fluid running Iron, irrespective of strength or body. This they get by using the high phosphorus Middlesboro and Lincolnshire pigs, which contain above 1 per cent. phosphorus. Many founders here seem to take no account of the results in castings from using cold short Irons. Lincolnshire pig is notoriously cold short, and castings made from it are brittle and frail. But the first desire of the English founder is to get an Iron that will melt at a low temperature, with an economy of fuel, and one that will flow easily from his cupola.

"Herein lies one of the objections to American Iron, as exemplified in No. 3 Foundry grade. The claim of the English founder is that by the introduction of Alabama No. 3 into his cupola he increases the cost of fuel, because he finds he has to alter his charges, putting in more Coke to melt the harder Iron, and complains accordingly, but fails to appreciate the better tone of his castings and their greater endurance.

"An analysis of standard Alabama Iron, in parallel column with a representative analysis of Middlesboro, will serve to show the differences above noted:

	Alabama No. 3.	Middlesboro No. 3.
Iron .....	92.92	90.94
Silicon .....	2.29	3.33
Graphitic carbon.....	2.90	3.37
Combined carbon .....	0.64	0.10
Phosphorus .....	0.78	1.51
Manganese.....	0.43	0.70
Sulphur.....	0.05	0.05
Totals.....	100.00	100.00

### Who the World's Manufacturers Are.

NEARLY all the manufacturing of the world is now done by one-seventh of its population, comprising such nations as England, France, Germany, Belgium, Holland and the United States. The world is turning out manufactured products to-day at the rate of \$38,600,000,000 a year, and America is doing one-third of this work. Manufacturing means better food, clothing and shelter for the race, higher planes of living and an increasing use of railroads, steamships and telegraphs, and the keeping in operation of the vast and complex processes of exchange of commodities (and travel incident to such exchange), called business.

The census of the United States for 1890 gives the value of the manufactures of this country for one year (1889) as \$9,373,000,000, and the census of 1880 gives the value for that year as \$5,370,000,000, showing the gain in ten years to have been \$4,003,000,000, or a gain in a decade of 74.54 per cent. At this same rate of gain for ten years, between 1890 and 1900, the value of America's manufactured products in 1900 would reach \$16,360,000,000. Suppose one cancels this rate of gain for three years of business depression, there would still remain \$14,273,000,000 as the value of America's manufactures for the year 1900, or the sum of \$12,873,000,000 as the present (1898) rate of the annual products of this country.





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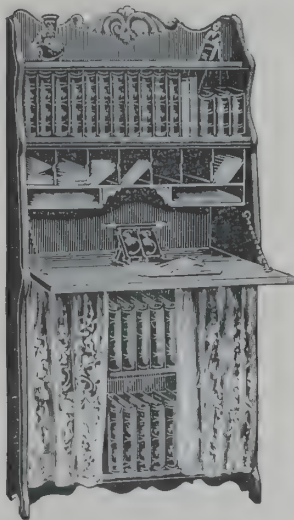
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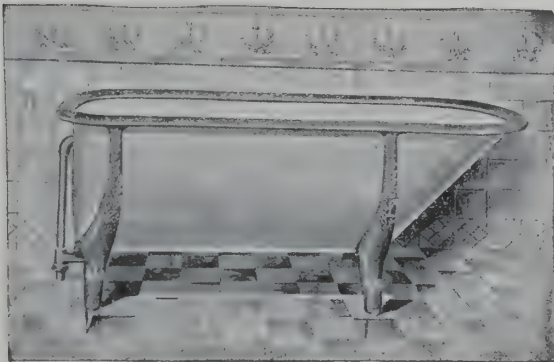
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THE STEEL-ENCASED TUB has an outside construction like the Enamelite, finished in two delicate shades of green enamel, with gilt decorations. The copper lining has a highly polished tinned surface. The overflow on both tubs is brass nickel-plated.

Enamelite, with overflow, 4½ ft., \$8.75; 5 ft., \$9.25; 5½ ft., \$10.00; 6 ft., \$11.00.

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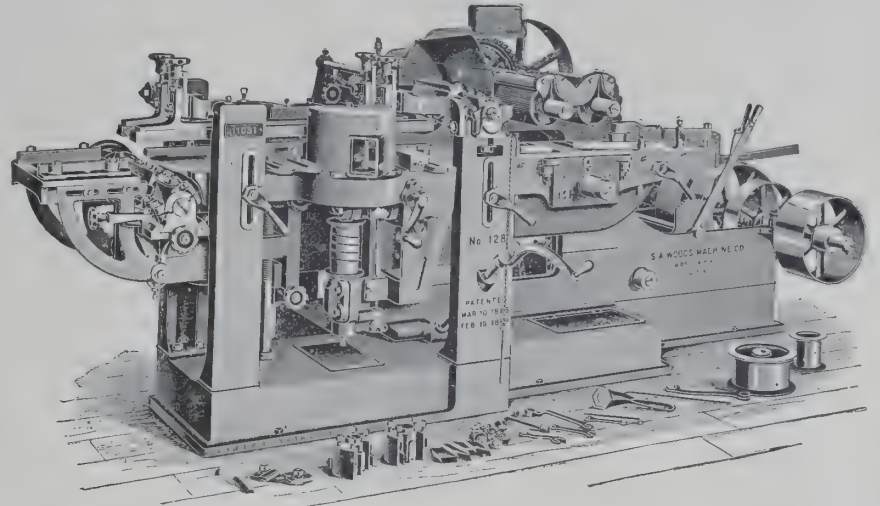
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REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of NEW JERSEY PAINT WORKS, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C. for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.

MILLS EDWARD. Master Schooner "Florence Shay."



### A German View of American Expansion.

THE *Frankfurter Zeitung*, which has been one of the most distinguished and outspoken friends of the United States during the recent war with Spain—in sharp contrast with the attitude taken by a portion of the German press—has a very able and exhaustive article on the results of the war, from which we take the following extracts:

"The conclusion of peace which ends the Spanish-American war marks a new epoch in history, not only for the United States, but likewise for Europe. The United States has taken an important step toward the conclusive control of the American continent; it has also reached beyond that and claimed its share in the conduct of the world's affairs. Since it now controls the West Indies, the construction of the Nicaraguan Canal will be no longer delayed. Then will the Eastern and Western portions of the Union be brought into closer relations, which will be of important significance, not only for the commerce, but for the naval power, of the United States.

"From San Francisco westward by way of Hawaii and the Ladrone and Philippine islands, which will be developed into strongholds of American power, the United States will reach across the Pacific Ocean to the Asiatic coast and will have a powerful voice in deciding the destiny of Eastern Asia, for it has there just as important commercial interests to foster and protect as any of the European powers. That it realizes fully the importance of this and other questions at issue is evinced by the promptness with which it is proceeding to a notable strengthening of its Navy and standing Army.

"With what force and energy the Union enters upon its rightful position among the controlling nations of the world will be shown by a glance at its material resources and productive capacity. There is, first, the fact that in the fiscal year ended June 30, 1898, the Union had a surplus of exports over imports amounting to \$595,000,000, while all the European nations show a more or less important deficit in their balance of trade—Germany about \$166,600,000 and England about \$571,200,000. Other comparisons are equally instructive. John Shafroth, in his speech before the House of Representatives, on the 26th of May last, gave the following statistical data:

"In the year 1890 the property of the United States was valued at \$62,000,000,000, while the property of the whole world was estimated at \$290,000,000,000. The American people, who number 70,000,000 souls, or one-twentieth of the population of the globe, possess, therefore, more than one-fifth of the entire wealth of the human race. The Union has 182,000 miles of railways, half as much as the remainder of the world entire. In the year 1892 the freight transported in the United States was equivalent to 845,000,000 tons carried a distance of 100 miles; in the same year all other countries together transported the same distance only 503,000,000 tons. The annual earnings of the railways of the United States are about \$1,000,000,000, nearly half of the railway receipts of the whole world, which amount to \$2,515,000,000. The steam marine of the United States registers 14,400,000 horse-power, one-third of the registered steam tonnage of the world.

"In the year 1896 the United States produced 10,000,000 bales of cotton, and out of the 13,000,000 bales produced by the whole world the Union alone consumed 3,500,000 bales—that is, more than one-fourth of the entire cotton consumption of the human race. Its production of cereals is more than one-fourth of the crops of the world entire. Its output of coal in 1897 reached 198,000,000 tons; while all other countries combined produced only twice as much—in round numbers 400,000,000 tons. The telegraph lines of the world included, in 1897, 4,908,000 miles of wires, of which 2,506,000 miles, or more than half, are in the United States. The postal service of the world transports yearly 17,000,000,000 letters, of which the United States alone sends 5,000,000,000. The mechanical appliances which the United States employs to aid and supplement human labor comprise more than one-fourth of the equipment of the entire world.

"These figures, to which might be added others equally significant, will suffice to show that the people of the United States, in respect to their resources and capacity of performance, can no longer be compared with any other single nation; the comparison must be made with the entire rest of the world. They form the clearest and most convincing proof that the United States is, in fact, a great world power and as such must have a world policy.

"Thus far there is not the slightest cause to regret the development of this power; we believe, on the other hand, that it is a cause for rejoicing to all mankind. We can indeed see the numerous dark spots which shadow the condition of the American people; but when one compares with these the many bright spots, it is seen that there are far more lights than shadows. The American national character wins when compared with that of other nations; and it must be remembered that in the frankness and intelligence of

this national character, its tireless energy and ardor for improvement, are given the conditions and the strength which modify even the defects of the people and shield them from the dangers of degeneration. Labor, freedom, tolerance—these are the foundations upon which American statehood rests, and upon which it can securely rest in future."

### The Battleship "Illinois" Launched.

THE first-class battleship *Illinois* was successfully launched October 4th from the yard of the Newport News Shipbuilding & Dry Dock Company, Newport News, Va., in the presence of a large concourse of spectators. The *Illinois* is a sister vessel of the *Alabama*, now building at Cramps' yard in Philadelphia, and of the *Wisconsin*, building by the Union Iron Works at San Francisco, Cal. Her first keel plate was laid February 10, 1897, and according to the terms of the contract the vessel is to be completed by October 5, 1899. The contract price for her construction is \$2,595,000. The principal dimensions of the *Illinois* are as follows: Length on load water line, 368 feet; beam, extreme, 72 feet 2½ inches; draft on normal displacement of 11,525 tons, 23 feet 6 inches; maximum displacement, all ammunition and stores on board, 12,325 tons; maximum indicated horse-power (estimated), 10,000; probable speed, 16½ knots. Normal coal supply, 800 tons; coal supply, loose storage, 1,200 tons; full bunker capacity, 1,400 to 1,500 tons. Complement of officers, 40; seamen, marines, etc., 449.

The main battery will consist of four 13-inch breech-loading rifles in balanced turrets, oval in shape, placed in the centre line of the vessel, and fourteen 6-inch rapid fire guns. The secondary battery will consist of sixteen 6-pounder rapid fire guns, four 1-pounder rapid fire guns, two Colt guns and two field guns. She will carry four torpedo tubes. The 13-inch guns have an arc of fire of 135 degrees on each side of the centre line, and the 6-inch an arc of 90 degrees on the broadside, with the advantage of those on the upper deck of a direct fire ahead and astern. Any injury to or near either of these 6-inch guns will be confined to its own compartment, as a 1½-inch steel splinter bulkhead separates each of these guns from its neighbor.

The armor belt, which extends from the stem to abaft the after turret, is to be 16½ inches thick at the top and 9½ inches thick at the bottom. This belt armor will extend from 4 feet below the normal load line to 3½ feet above it, and will maintain the full thickness amidships between the turrets for the distance occupied by the engines and boilers. Diagonal armor 12 inches thick connects this belt armor and barbettes, and extends from the slopes of the protective deck to the top of the side belt on each side. There will be two sets of triple expansion twin screw engines, each in its own separate water-tight compartment. The collective indicated horse-power will be about 10,000, with 120 revolutions per minute; stroke, 4 feet. There are eight single ended cylindrical boilers, each 15½ feet in diameter by 9 feet 11½ inches long, having a total grate surface of 685 square feet, with 21,200 square feet of heating surface; pressure, 180 pounds. These boilers are placed, two each, in four separate water-tight compartments. Eighty odd auxiliary engines will add greatly to the efficiency of the ship and will reduce manual labor to a minimum.

### Incombustible Wood.

IN view of the recent naval report on the destruction of Cervera's fleet, a description of a new process for making wood incombustible, taken from *Nature* (London), is interesting:

"The process may be said roughly to consist of removing the natural juices of the wood and replacing them with certain substances which not only make it fireproof, but also have antiseptic properties that prevent decay. The operation is effected in retorts or cylinders. The wood having been run in on trollies, the air-tight door is closed and the contents subjected to heat and the action of a high vacuum. This treatment is continued till the volatile and fermentable constituents have been withdrawn, the time required to attain this result varying with the character of the wood. The next step is to fill the cylinder with the fireproofing solution, the exact composition of which is kept secret, and force it into the wood under hydraulic pressure, the amount of which again differs for different woods, but may reach 150 pounds to the square inch or more. When thoroughly impregnated with the salts, the timber is taken out of the cylinders, restacked on the trollies, and put into the drying-kiln—a room through which hot air is continually circulated by powerful fans, and which is fitted with apparatus to condense the vapors given off by the wood. Here it remains till it is thoroughly dried—in the case of a load of average thickness about a month. It is then ready for delivery and use."



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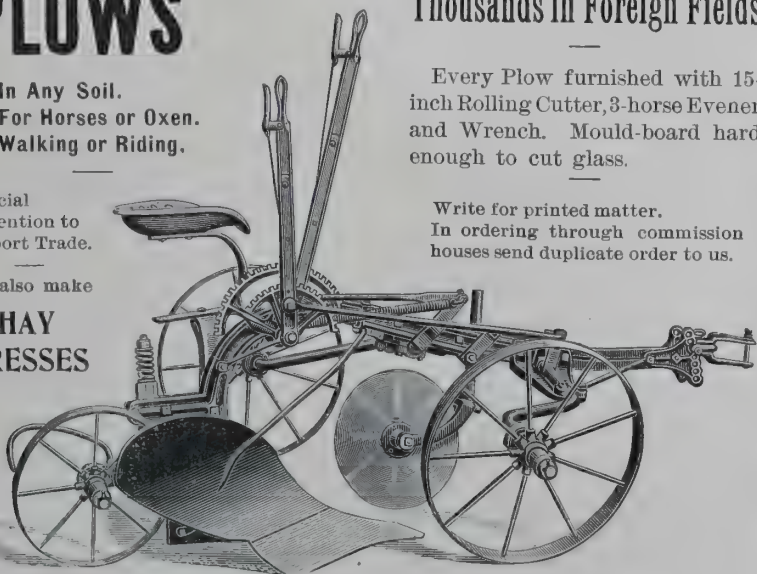
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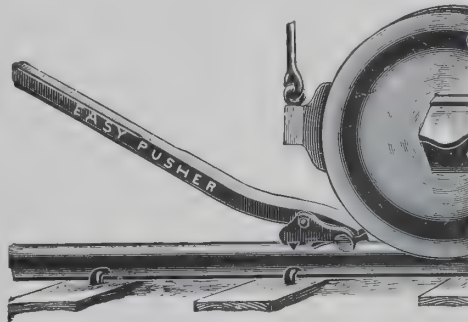
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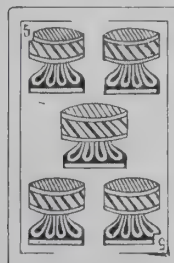
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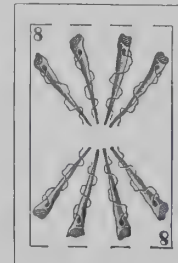


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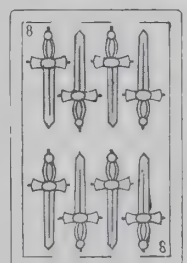


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## The Typewriter's Important Place in American Commerce.

A NEW and important American industry, which, along with the telephone, the bicycle and the manufacture of apparatus and supplies for amateur photographers, has grown up within the last twenty years, is that of the typewriter. In 1880 the aggregate capital invested in all four of the industries named was only a small part of what is now employed in the prosecution of any one of them. While the telephone and the wheel are ahead as regards the amount of money involved and the number of people engaged in their production and sale and in the production and sale of parts and supplies, the third place on the list undoubtedly belongs to the typewriter.

Any one who is disposed to question the typewriter's claim to a commercial rank above that occupied by the amateur's camera will do well to consider the remarkable progress which the former has made since its general introduction. Eighteen years ago writing machines were very few and were possessed chiefly by persons who had a money interest in their production. The whole number of machines in existence at that time was not so large as that which to-day represents the daily output of a single factory, and their practical value in business offices was by no means established. Opinions differed as to whether the typewriter really facilitated or retarded the work commonly done with the pen.

Before 1885 the typewriter's usefulness to business men had been clearly demonstrated. The business men began to appreciate the advantages to be derived from the machine's great speed and the superior legibility of its copy. Whether or not a typewritten letter carried as much dignity as one written with a pen, formed the subject of speculation, but doubts in that direction soon disappeared in the urgency of business, and the demand for typewriters increased rapidly. In 1890 thirty typewriter factories were in operation; they employed 1,735 men, and the value of their product was \$3,630,126. The machines were used in nearly all the large commercial houses in New York and in other cities, and excitement ran high among inventors and promoters eager to profit by the activity of the trade.

So helpful had the typewriter become in places of business, and so favorable were the reports concerning its simplicity, durability and manipulation, that it soon found its way into the workshops of clergymen, novelists, playwrights, journalists, and even into homes, where it was employed to facilitate the studies of spelling and composition among children. In 1893 one typewriter company gave regular employment to 2,300 workmen. During that year some of the leading makers were weeks behind in their orders. In New York a great deal of rivalry existed among typewriter concerns in the effort to supply the trade.

In 1895 a careful estimate placed the number of machines in use at not less than 450,000. During the year following 3,426 typewriters were used in thirty-four office buildings in this city. A statement published in the *Phonographic World* of April, 1896, showed that in New York there were then more than 3,000 typewriters in use south of Fulton street and east of Broadway, and that throughout the city the number of high-class machines in daily operation exceeded 35,000. Chicago, it was estimated, used 15,000; Philadelphia, 14,500; Boston, 6,000; St. Louis, 4,700; Baltimore, 4,300; Washington, 3,500; Cincinnati, 3,500, and San Francisco, 3,000, while Cleveland, Buffalo, Pittsburg and Detroit used more than 2,000 machines each. In not one of a dozen smaller cities of the Union were to be found less than 500, and some of them had as many as 1,500. The total number in use in the United States was placed at 150,000.

Since 1896 the manufacture and sale of typewriters have greatly increased. No statement of the exact number made and used at the present time is available; it certainly exceeds half a million, and reaches perhaps three-quarters of a million. Agencies for the sale of the machines and dealers in typewriter supplies are located in every city and in many small towns of the country. The number of schools in which typewriting is taught is estimated to be 1,500, attended by more than 70,000 pupils, a large majority of whom are women.

Perhaps no other distinctly American industry has been so little affected by foreign competition as has that under consideration. Despite repeated attempts on the part of people of other nations to devise writing machines which would supplant those made in this country, the American product is to-day as much a favorite abroad as it is at home. In fact, America practically supplies the demand for typewriters all over the world. The exportation of them during the past eight years has probably been about one-third of the entire production. The total value of the typewriting machines and parts exported during the fiscal year ending on June 30, 1898, was \$1,902,153.

The business of typewriter making lately has become even more extensive and important than was predicted ten years ago by its most sanguine promoters. This is due partly to the fact that the public's great appreciation of the machine has in many quarters caused its use to be insisted upon, and partly to numerous improvements which, from a mechanical point of view, have rendered it more desirable and have enlarged its field of usefulness. The successful introduction, also, of a typewriter for use upon books is another noteworthy feature of the industry. From the time the machine first made its appearance attempts have been made to construct an instrument which could be used as well upon bound pages as upon loose sheets. The object was not accomplished, however, until recently. Book typewriters are now in great demand on both sides of the water, and their sale promises to make business brisk for the manufacturers.

The typewriter's rapid progress in the last few years seems almost incredible in view of its extremely slow development prior to twenty years ago. The idea of devising a machine that would record words appears to have been first conceived in 1714. In that year Henry Mill of England patented and produced a contrivance for the purpose of printing embossed letters for the blind, and, strangely enough, it is said that his invention had several characteristics in common with our modern typewriters. Seventy years passed before the invention of another writing machine. This appeared in France. In 1829 a typewriter was patented by W. A. Burt, an American. In 1833 France was again in line with a queer-looking machine called the "kytograph," which was designed to write music as well as words. Ten years later a resident of Worcester, Mass., contrived a typewriter, the most objectionable feature of which was its slowness of operation. Next came the invention, in 1850, of O. T. Eddy of Baltimore, whose device was intricate and otherwise unsatisfactory. From that time until the invention of John Pratt of Alabama, in 1866, four or five American patents were issued for similar machines, but none of them was of much practical value. Pratt's patent was closely followed by numerous others, from which the modern typewriters have been evolved.

Judging from the present activity of inventors, the machine's evolution is still progressing at a lively rate. The number of typewriter patents granted in the United States during 1897 was 90, and at the beginning of this year the number granted since 1880 had reached 1,410. There appears to be no doubt, therefore, considering the machine's popularity and rapid improvement, that the universal demand for American typewriters will continue to increase as time goes on.—*The New York Sun*.

### Some Large Tools.

A LOCAL paper speaking of the preparations being made by a well-known American firm to build the pumping engines for a waterworks contract, the specifications of which called for some of the largest engines in the world, says: "The making of the great engines for the new waterworks will necessitate greater facilities than the company now has, and there are already being made some gigantic machines and machine tools for the work in hand that will have to be put up in a new establishment. Four of the machine tools that will be put up, and that are now building, will be record-breakers, beating in size anything that there is in the world. One of these will be the big planer, the largest in the world, which will be 16x16x56 feet in its working parts, 112 feet long and 32 feet high. The largest boring machine in the world will be set up in the new plant, having a diameter of 32 feet, a swing of 32x16 feet, and being 32 feet high. The third world's record-breaker will be the hydraulic press, which will have a nominal capacity of 500 tons and be capable of 1,000 tons. It will have a 4-foot stroke and be 38 feet long. The key-seating machine will cut a key seat in a wheel hub 5 inches wide and 4 feet long."

**The Future of American Corundum.**—American manufacturers of emery wheels are looking forward with much interest to promised developments in the production of corundum in North Carolina. It is expected that within ninety days two good-sized plants will be in operation, and that they will be able to produce this abrasive in sufficient quantities to bring prices down to a moderate basis. Emery wheel makers have been seriously handicapped by the high cost of corundum, which barely enabled them to exist, as their selling prices necessarily had a limit. More reasonable cost of raw material will allow them to make a little profit on their work. The Canadian supply of corundum has also been the subject of investigation by American emery wheel makers, who find that the situation is quite promising in that direction.





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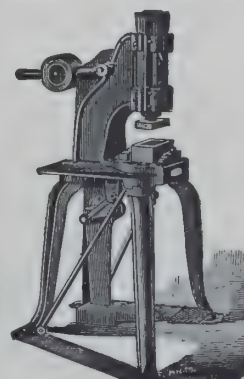
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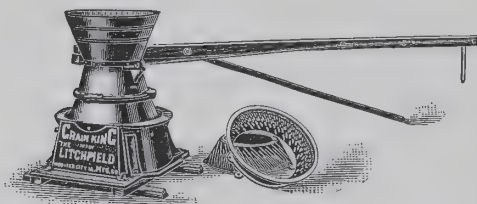
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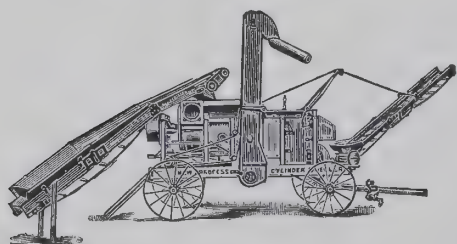


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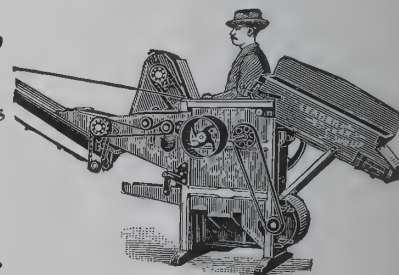


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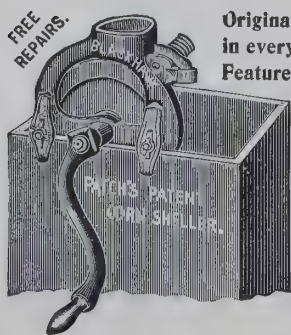
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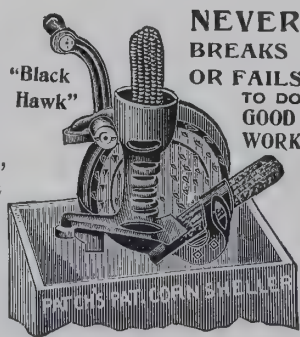
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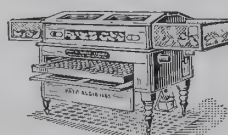
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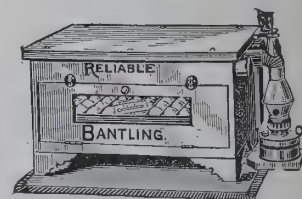
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### Artesian Wells and Modern Well-Drilling Machinery.

OUR attention has recently been called to some very interesting and remarkable results that have lately been obtained from artesian wells, not only in this country but abroad. The importance of artesian wells can hardly be overestimated. Many now populous and prosperous regions in this country would be entirely uninhabitable but for their use. In Southern California, where the wells are used for irrigation, there are now over 3,000 flowing wells, and in San Bernardino county alone there are 2,000 wells, which flow from 30 to 4,000 gallons per minute each. South of Tulare County is a valley ten to sixteen miles wide, fifty miles long, in which there are over 100 flowing wells from 300 to 470 feet deep, which flow from 200,000 to 3,000,000 gallons each, daily, total flow over 48,000,000 gallons daily. One of these wells will irrigate a square mile, or 640 acres of land. A well supplying five gallons of water per minute will irrigate one acre of land in regions where there is no rain fall. Within a radius of ten miles, in one part of Kern County, California, are ten wells, each flowing not less than 1,000,000 gallons daily; total flow, 23,600,000 gallons, sufficient to irrigate over 20,000 acres. One of these wells has flowed 2,500,000 daily for several years, feeding an irrigation ditch for many miles. Outside of this district, but in the same region, there are over 500 other drilled wells, ranging from 250 to 1,000 feet deep, which are pumped chiefly by windmills. Pomona, Cal., is supplied by one artesian well that flows 1,500,000 gallons daily. A man in San Bernardino County, California, some years ago purchased 3,000 acres of arid land at a very low price, part of it costing him less than \$1 per acre. At different times he has drilled forty-two artesian wells from 150 to 500 feet deep, reclaiming 2,450 acres, which are now under orange and raisin cultivation, every acre of which will sell for \$200 to \$500. All of the above wells are in sections of country of high altitude—2,000 to 12,000 feet above sea level.

There are over 250 flowing wells in the vicinity of Denver, Col., which flow simultaneously 145,000 to 432,000 gallons of water each daily. There are also several hundred other non-flowing wells in the same district, which are pumped by common hand-pumps and windmills. In the San Luis Valley, Colorado, in an area of 1,000 square miles, at an altitude of 7,000 feet above sea level, there are over 2,000 flowing wells. In the vicinity of Monte Vista, Col., there are ninety wells. The "Empire Farm" of 12,000 acres, at Alamosa, Col., is wholly irrigated by artesian wells.

The "Mormon Church Records" show that there are over 5,000 drilled flowing wells in Utah, by which over 100,000 acres of once valueless, arid lands have been reclaimed, made fertile and valuable. In Nevada, in altitudes of 6,000 to 11,000 feet above sea level, there are sixty-seven wells, each flowing from 60,000 to 1,000,000 gallons daily.

One of the most wonderful achievements on record is the great success that has been made with an American well-drilling machine on a sugar plantation containing 2,000 acres of land located in a valley, fifty miles wide and sixty miles long, in the vicinity of Azua, on the south side of the island of San Domingo, West Indies. The peculiarities of this location were, that while the rain fell on the surrounding mountains almost every day of the year, the atmospheric conditions were such that rain seldom ever fell in the valley. The consequence was, there was not sufficient water for raising a fair crop of sugar cane.

Five wells were drilled. The estimated production of each of the wells is as follows:

Well No. 1,	Flowed	250,000	gallons	per	day.
" No. 2,	"	350,000	"	"	"
" No. 3,	"	750,000	"	"	"
" No. 4,	"	75,000	"	"	"
" No. 5,	"	400,000	"	"	"

In Well No. 5, the water is discharged above the surface with such great force that it brought to the surface stones weighing over  $1\frac{1}{2}$  pounds each.

The great success of the above wells induced the owners of the adjoining plantation (consisting of 8,000 acres of land) to order a similar machine.

The United States Consul, at Managua, in Central America, reports to

the State Department, at Washington, that the boring of artesian wells has become a new industry in Central America, and a leading merchant has drilled a number of wells 700 to 800 feet deep. As some of the wells do not flow, a steam pump is used to bring the water to the surface. The wells furnish good drinking water to the town of Jinetepe and Deriamba, where the people before had only brackish, stagnant water, collected in pools during the rainy season, for drinking. A certain price is charged for the water, and there seems to be a large profit in it, one of these wells yielding an income of over \$19,000 per annum.

In every case, intending purchasers of well-drilling machinery should see to it that their purchases are made from makers of absolute reliability and unquestionable reputation. No class of machinery is subjected to more exacting tests, and a few dollars difference in the price is of no importance whatever compared to quality of product. A striking instance occurred recently in Teplitz, Bohemia, where two Austrian engineers, after working six months and placing the city at an expense of \$10,000, gave up the task of drilling a well altogether. One of them lost his tools, and the other went less than 100 feet. A third trial with machinery of local manufacture resulted in the breaking off of 180 pounds of steel at a depth that required fourteen days' labor to extricate it. Finally an American drilling machine was tried and water struck at a depth of 1,000 feet. It had to go through the hardest porphyry rock and granite, in which were many cavities with large boulders in the crevices.

The manager of a large plantation in Cienfuegos, Island of Cuba, recently wrote to the American firm that had supplied him with well-drilling machinery, that his well was now flowing 141,000 gallons a day, and added: "I think you must have splendid workmen in your shop and use good material, as the tools furnished with the machine are the best. The temper in the drills seems to be wonderfully perfect." When one reflects upon the thousands of wells drilled in this country, it is not surprising that our manufacturers of well-drilling machinery meet with such marked success abroad.

### The American Board Rule.

THE American board rule is founded upon the principle that a foot of lumber is one inch thick and 12 inches square, and that this is composed of 12 pieces one inch wide and 12 inches long. In a 12-foot board it takes a strip one inch wide the whole length of the piece to make a foot of lumber; in a 14-foot board it takes a strip the whole length of the board only  $\frac{11}{12}$  of an inch wide, and if 16 feet long only  $\frac{10}{12}$  of an inch wide, and by the same theory an inch in width in a 12-foot board, as has been stated, makes one foot of lumber; a strip an inch wide in a 14-foot board makes  $\frac{11}{12}$  of a foot or one foot and  $\frac{1}{12}$ , or  $\frac{1}{6}$  of a foot over. But as the figures on the board rule represent the number of feet in a board whose width corresponds with those figures, it must be seen that in a 12-inch board, as has already been stated, it takes an inch in width to make one foot, hence the figures in the 12-foot run are all exactly one inch apart on the length of the rule; but in a 14-foot board it requires only  $\frac{11}{12}$  or  $\frac{1}{6}$  of an inch in width to make a foot of lumber, hence in the 14-foot run the figures on the rule are placed  $\frac{1}{6}$  of an inch apart. In a 16-foot board it requires only  $\frac{10}{12}$  or  $\frac{5}{6}$  of an inch in width to make a foot, hence in the 16-foot run the figures are only  $\frac{5}{6}$  of an inch apart. The same rule holds good in all lengths over 12 feet, but in lengths under 12 feet the rule is reversed, the spaces being wider between the figures. For instance, if the board is only 10 feet long it will require  $\frac{10}{12}$  or  $1\frac{1}{2}$  inches in width to make one board foot, hence in the 10-foot run the figures are  $1\frac{1}{2}$  inches apart. In the 11-foot run they must be  $1\frac{1}{11}$  inches apart.—O. S. Whitmore, in *Dixie*.

### A Remarkable Event.

A REMARKABLE recent event has been the success of Mr. Armour, of the well-known meat-packing firm of Chicago, who has succeeded in obtaining the contract to supply the British Admiralty with the whole of the curled hair they require. The contract had formerly been divided between four English firms, one of them in Sheffield; but Mr. Armour having made up his mind to deal directly with the consumer has contrived to bag as a substantial start the whole work for the British fleet. It must be confessed, too, that his curled hair, which is supplied at 2d. a pound less than the English quotation, is of very excellent quality, and is a distinct testimony to the perfection to which the American has brought his machinery and his manner of working it.—*The Hardware Trade Journal, London*.



### A Thirty-Story Building.

A THIRTY-STORY building is now going up on Park Row, New York. *Engineering Mechanics* gives some technical details regarding this very striking structure, some of which may be of interest to our readers, the more that THE AMERICAN EXPORTER is published almost under its shadow. The entire structure will weigh 65,200 tons, of which 9,000 tons will be steel. Some of the interior columns have no distributing girders, but rest directly on the grillage beams, and have each an independent foundation. Each foundation was separately designed for the load it had to carry, and the size of the girders and the grillage beams vary accordingly. Each girder sustains a load of 2,200 tons. They are 26 feet long and 8 feet deep, and have four web-plates, each  $\frac{3}{8}$  inch thick. There are four angles 6x6 inches by  $\frac{7}{8}$  inch in each flange, together with three plates, each 2 feet 8 inches wide by  $\frac{3}{4}$  inch thick. The girder is carried on 35 I-beams 12 inches deep and 5 feet long, which are separated by distance pieces. In the foundation in question there are four of these distance pieces between every two beams, but in some of the foundations, where the length of the beams is 6 feet, there are six distance pieces between every two beams. The distance pieces are box-shaped, and have milled surfaces which bear evenly on the top and bottom flanges of the beams. The grillage beams rest on the top of the granite caps, and are bedded on cement  $\frac{1}{2}$  inch thick. If this thickness varies more than  $\frac{1}{2}$  inch, it is made up with crossed layers of flat bars grounded in cement.

The largest distributing girder is that carrying the four columns facing Theatre Alley. It carries a load of about 2,930 long tons, and weighs 47 tons. It is 47 feet  $2\frac{1}{2}$  inches long, 6 feet,  $0\frac{1}{2}$  inch deep over the angles, and has flanges 2 feet 8 inches wide. There are four web-plates, each  $\frac{3}{4}$  inch thick. Each flange is composed of five plates  $1\frac{1}{8}$  inch thick; the angles which connect them with the webs are 6x6 inches by  $\frac{3}{4}$  inch. Where the bases of the columns rest on the top flange the rivet heads are countersunk.

The girder for Theatre Alley front is carried on 61 I-beams 12 inches deep and 4 feet long, these being placed on the top of the granite caps for the girder-carrying columns. All the columns which do not rest on the distributing girders are carried on short independent girders which rest on I-beams supported by the grillage beams so as to distribute the weight evenly over the granite caps of the piers. The floor beams are generally composed of two I-beams bolted together with  $\frac{3}{4}$ -inch bolts, and have cast-iron distance pieces between them. There are three or four distance pieces to each span, and they are so made that the flanges of the I-beams will not be less than  $1\frac{1}{2}$  inches apart. The beams which carry the fireproof flooring are all tied together with  $\frac{3}{4}$ -inch bolts to take the thrust of the flat arches. The floor-beam tie rods are placed 3 inches above the bottom of the beams. The floor beams are framed so that the bottom presents two different levels, one 5 inches above the other. In the area, where 15-inch beams are used, the beams and girders are framed flush. The 10-inch and 12-inch beams are framed flush at the bottom, which is 5 inches above the bottom of the 15-inch beams.

Box and lattice girders are used for connecting the columns at the walls, and they are attached to the columns in such a way as to make the connections as stiff as possible in order that it may do service as vertical wind bracing. Great lateral stiffness is given to the building in this way. There is also a vertical diagonal bracing between columns. This bracing is composed of two angles 6x4 inches by  $\frac{5}{16}$  inch in the lower stories, and smaller in the upper part of the building. The floors are composed of terra-cotta flat arches of end construction. The blocks are 12 inches deep for the 15-inch floor beams, and 10 inch deep for the others. They are set in Portland cement, and are covered with cinder concrete. The weight of this form of construction, including the top filling, does not exceed 65 pounds per square foot where 15-inch beams are used, and 45 pounds per square foot where 10-inch beams are used. The partitions are of terra-cotta blocks 3 inches thick for all the floors except the first, which has blocks 6 inches thick.

### The American Time System for Universal Use.

IN an article in the *Revue des Deux Mondes* on "Legal Time," M. A. Dastre points out that from an international point of view the time-systems of the world are inconsistent and impractical. Of course, from the exact standpoint, which is that of the astronomer, every meridian on the earth's surface has its own standard time. This is the "natural" system, but it never has been and never can be followed out precisely. As M. Dastre says:

"From the moment when the inhabitants of the same city accepted a common time-standard for the regulation of their common relations they

had already broken with the natural system; they had made a first compromise. Every displacement involves a change in time. To be exact, we should alter our watches whenever we go from one place to another. . . . On an eastward or westward journey the pedestrian, horseman or cyclist should set his watch forward or back one second for every three hundred yards that he advances. In other words, we should have to give up all idea of a time-standard and cease to benefit by the invention of clocks. Such exactitude is evidently impracticable, and . . . there must always be a difference between astronomical and ordinary time."

How closely, then, shall the time that we use in ordinary affairs agree with astronomical time? At first each city or town had its own local time, but this has been found most confusing, especially in railway travel. Three systems have been proposed or used to remedy this—the system of national time, that of universal time, and that of time belts. By the first every country uses the time of its capital. This arrangement now obtains in many European countries, but it is not practical for lands which, like the United States or Canada, extend for thousands of miles east and west. By the second the whole world has one standard of time—say that of Greenwich or Paris. This would seem at first the simplest plan. It has been advocated by many scientific men, and it would do away with many anomalies—for instance, the dropping or adding of a day in voyages around the world. But while by this plan it would be 12 o'clock at the same moment all around the world, there would be only one meridian on the earth's surface where this hour would correspond to noon; at other places we should have 12 o'clock coming in the middle of the morning or at some other incongruous time. There would be really nothing absurd about this, but it would probably be too much at variance with our conventional ideas ever to be adopted. To quote M. Dastre again:

"A time system that should force us to say, 'It was 9 A. M.; the sun was just rising,' would be condemned without a hearing. We perform like acts at like moments during the day, at like stages in the sun's course; it is natural that the time-notation of these moments should be sensibly similar. With these conditions the knowledge of the hour gives us useful information. If I know that at the present moment it is midnight in New York, I picture the great city as asleep, and if I am told that it is 2 o'clock in the afternoon there, I seem to see the city active and at work.

"Just to what degree must we respect this concordance between the conventional hour and the local time?"

After discussing this question the author concludes that the most practical system is that already adopted in the United States, in which the country is divided into belts running north and south, whose standard time differs by just one hour so that the greatest discrepancy between actual and conventional time is thirty minutes. It has already been proposed to extend these zones east and west around the world, and M. Dastre is of opinion that this should be done at once. He proposes, however, to modify the shape of the belts in certain cases, so that they may conform to the boundaries of countries. The belt in which Greenwich is situated would be known as the "universal" belt, and its time as "universal" time. The other belts would be numbered or named. One plan is to letter them all and also give them geographical names, beginning with their characteristic letters. The trial of the plan in this country has relieved us of such a vast amount of confusion that, so far as we know, it has not a single opponent among us. Its extension to the rest of the world cannot come too soon.

### Studying Alabama Steel.

THE London *Iron and Coal Trades Review* says that "an important basic steel works is about to be erected at Birmingham, Ala. The enterprise has evoked much more interest on the other than on this side of the Atlantic, but it is very doubtful whether, if it should realize the expectations of its promoters, it may not also before long become a matter of concern to Great Britain. At any rate, it is stated that the new works will produce the cheapest basic steel in the country; that it will have a combination rail and ocean freight rate, in connection with cotton export, lower than has yet been secured by any Pennsylvania mill, and that it should become a larger factor in the foreign rail trade, as well as in billets, sheet bars, rods and steel bars. Although the chief significance of the Birmingham steel plant may seem to be on the side of its export prospects—the marketing outside the country of a large tonnage that heretofore has helped to depress the domestic price of crude iron—the possibilities of competition in the American steel market at home are not to be overlooked."



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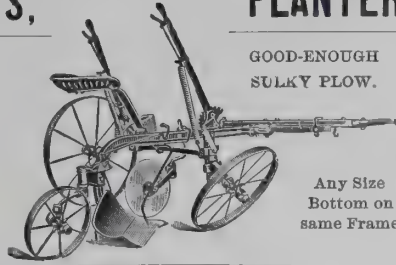
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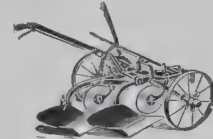


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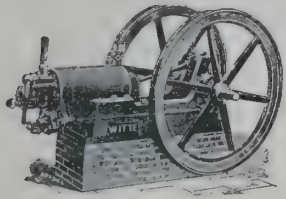
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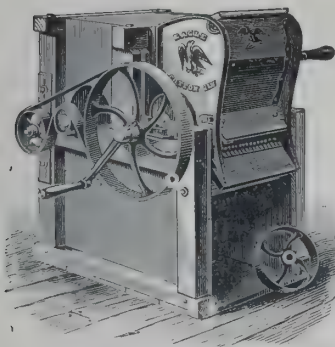
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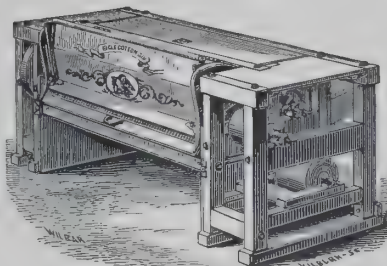
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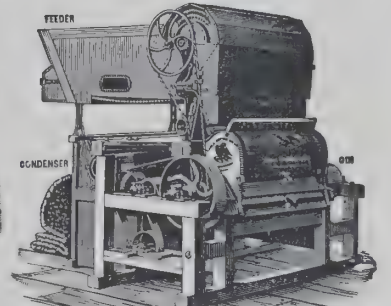


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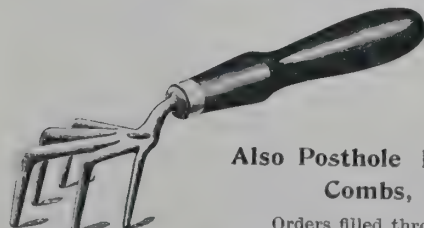
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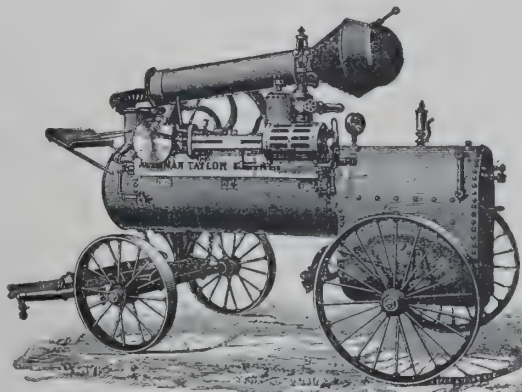
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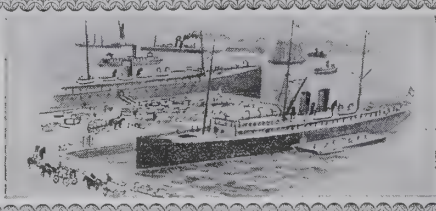


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## EXPORT



## NOTES.

News of Notable Export Contracts, Sales and Shipments.

Exports of furniture to Mexico are showing a marked increase over last year, as do the sales of United States typewriters and sewing machines.

A considerable order for coffins has been sent from Venezuela to the United States. According the Venezuelan *Herald*, an order for over 2,000 has been forwarded by two undertakers of Caracas.

It is freely rumored in Birmingham that a contract has been fixed for the shipment of 30,000 tons of steel billets to that town, from Messrs. Carnegie's works at Pittsburg.—*London Iron and Coal Trades' Review*.

Manufacturers of machine tools with foreign connections are said to be from four to six months behind their orders, 60 per cent. to 90 per cent. of which comes from abroad, with no signs of cessation. Domestic trade in these lines is at present dull.

An order has been received by the St. Louis Car Company, St. Louis, Mo., U. S. A., for 250 street cars for the Japanese Government. The order calls for the completion and shipment of the cars within the next ninety days. The contract price is said to be \$300,000.

Foreign trade is sought by machinery builders with no less energy than when it was more a matter of necessity, and fresh inroads are being reported upon the world's markets. Recently several large evaporating plants were sold by a Chicago maker to packers in Australia in competition with producers from Europe.

The exports of timber and lumber from Pensacola for the month of August were larger than they have been in any month since last February, and the indications are that for the current month they will show an increase. The exports were principally to the United Kingdom and Continental ports and were valued at \$796,846.

The Illinois Steel Company has just completed the delivery of 6,000 tons of steel plates at Glasgow, Scotland, at a price per ton which made the total contract worth nearly \$1,500,000. While engaged in the delivery of these steel plates, manufactured for shipbuilding purposes, the company was also delivering light T rails in Germany.

The contracts for pumps for the Russian battleship and the Russian cruiser now building at Philadelphia and for the new American battleship *Maine* have all been awarded to the Snow Steam Pump Works, of Buffalo, N. Y., U. S. A., their plans having shown marked advancement in marine engineering as applied to pumps.

The Scully Steel and Iron Company, of Chicago, has just closed a contract for the delivery of 2,500 tons of steel plates at Victoria, B. C., to be used in the construction of five British steamships by one of the largest shipbuilding firms at that point. The value of the contract exceeds \$100,000, a sum which on its face may not carry the full significance of the deal to those outside of the steel and iron business. It is worthy of note that the contract was secured against the competition of the largest steel firms in the country, England and Germany.

The William Cramp & Sons Ship and Engine Building Company, of Philadelphia, report they are building at present for American account seven vessels. These steamers aggregate 36,168 tons displacement, showing that the size of each is above the average. In addition to this work there are under construction by this firm three vessels for foreign account of 23,600 tons displacement, and four war vessels. They have also prospective orders which will keep the plant running for many months to come.

The United States Sanitary Company, Washington, D. C., have just completed and shipped to Santiago, Cuba, three carloads of garbage wagons and carts. Advanced sanitary methods are "following the flag," and it is hoped that Manila, Havana, Honolulu and other of Uncle Sam's new possessions will also fall in line, for, if reports as to the sanitary condition of these cities are correct, they need some of our new methods for the scientific treatment of offensive subjects.

On September 16th, the Hastings Town Council accepted the tender of R. D. Wood & Co., Philadelphia, for the supply of 9,850 yards of 16-inch

water-pipes; also 2,670 yards of 10 inch and 500 yards of 6-inch cast-iron sockets—weighing in all about 2,050 tons, with an additional 35 tons of irregular and short lengths. Alderman Elworthy, in moving the acceptance of the tender, remarked that, although the pipes had to be shipped from Philadelphia, some of their best Glasgow firms were beaten by 13s. or 14s. a ton. The original estimate for pipes was £11,610, whereas the gross amount of the tender was £10,359.

The trade in Southern iron for export is now very active. Out of 23,000 tons sold during last week by the Tennessee Company, 22,000 were sold for export. The export sales last week approximated 30,000 tons, and for the past thirty days will not be far from 100,000 tons. Not only is the quantity of iron sold increasing, but there is another feature of consequence connected with it, and that is the buying, as to grades, is widening. It now includes Nos. 1, 2 and 3 foundry and the soft grades, besides gray forge and basic iron. English buyers are very eager and the Birmingham correspondent of the *Manufacturers' Record* makes the prediction that the time is not far distant when the price paid by the export trade will regulate rates in the domestic market.

The Edward P. Allis Company, Milwaukee, Wis., have recently shipped a 1,200 horse-power horizontal compound engine to Lazare-Weiller & Co., of Havre, France; also a vertical cross compound engine of about 100 horse-power to Ludwig Loewe & Co., of Berlin, Germany. They have lately installed three engines for the Middlesborough tramways of Middlesborough, England, and have under way six large engines for the Central London Underground Railroad, two of which have been shipped. They are also building six large vertical compound engines for the Dublin tramways, Dublin, Ireland; three for the Sheffield tramways, Sheffield, England; two for an electric lighting plant in the City of London, and two for an electric plant in Elmsmere, England.

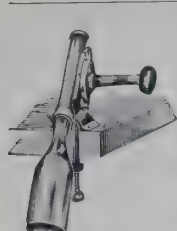
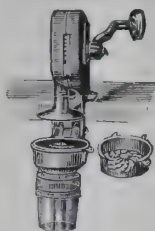
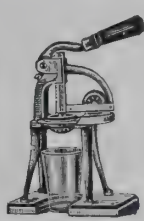
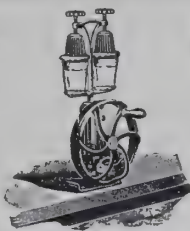
### Two Crack Locomotives—A Comparison.

THE question of the relative speed of American and English passenger trains has never been, and is never likely to be, decided conclusively. The average speed of English passenger trains is higher than that on Continental railroads, but whether or not it is higher than that on American railroads generally, for like service, is a disputed question. The run from London to Edinburgh, 400 miles, with three stops, has been made in seven hours and thirty-eight minutes, an average of more than fifty-two miles an hour, and the run from Hoboken to Buffalo over the Delaware, Lackawanna and Western, a distance of 407 miles, has been made, with four stops, in seven hours and thirty-seven minutes, an average of fifty-four miles an hour, which has been more than equalled by runs for shorter distances on the New York Central. Recently a comparison of American and English express engines has been made between the well-known locomotive "No. 999" of the Central and the "Worcester," which makes the run between London and Exeter on the Great Western Railroad of England.

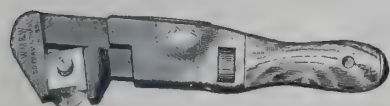
The cylinders of the two engines are precisely the same in dimensions, 19x24 inches. The weight of the English engine is 107,000 pounds; that of the American engine is 124,000. The diameter of the drive wheels is larger for the English engine, but the boiler pressure of the American engine is greater. The speed of the two engines is so nearly the same that there is only a fraction of a mile's difference in a run as long as that from New York City to Albany. The statement is made by English engineers that in a comparison between the two crack locomotives a preference is to be given to the English on account of the grades, which are heavier on the railroad over which it runs than along the east bank of the Hudson; but, on the other hand, the weight of the American locomotive and the train drawn is greater, and, moreover, the roadbed of English railroads is much more substantial than that of American lines as a rule. In outward aspect, at least, the typical American locomotive is far superior to its English rival. It is a thing of beauty, an ornamental, attractive, symmetrical piece of machinery, very much more elaborate and very much more seemly than its English rival.

**Exports of Oatmeal.**—For the eight months ending August 31st, the exports of American oatmeal show a very big gain, being 55,851,778 pounds, valued at \$1,163,572, against 31,049,721 pounds, valued at \$632,523, for the corresponding period in 1897. Here is an increased foreign call for American oatmeal in seven months that absorbs 24,802,057 pounds more than for the same months of the preceding year. New York is credited with exports of 23,990,156 pounds; Boston, 18,202,000 pounds; Baltimore, 9,945,462 pounds; Philadelphia, 3,805,271 pounds.



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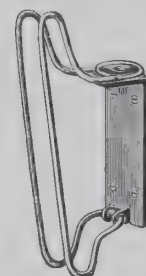
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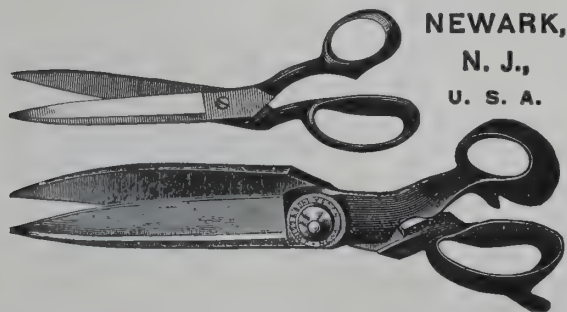
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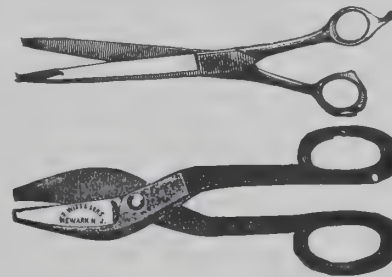
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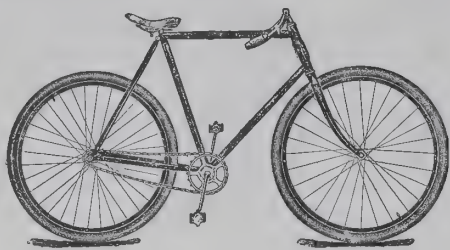
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Models 58 and 59,	60	Tandem, { Diamond or Drop Frame }	125

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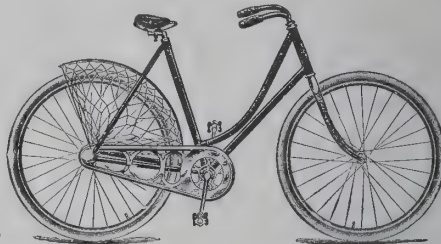
**CRANKS** Standard length, 6½ inches. 7-inch can be furnished.

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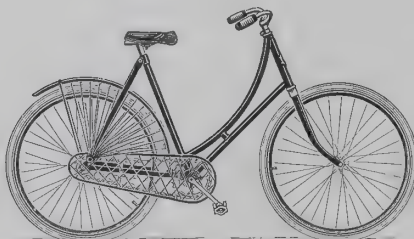
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Model 33 is a bicycle of excellent quality and finish, and far superior to many machines listing at higher price. The frame is weldless steel tubing of best quality, built in two heights, 23 and 25 inches; wheels, 28 inches diameter; gear, 73; cranks, 7 inches. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, gold striped, nickel trimming. Weight, about 23½ lbs.

ARENA MODEL M. Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



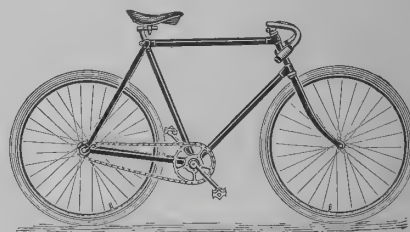
Tribune Model 34. Price, \$50.00.

Model 34 is practically the same as Model 33, excepting that it is built with drop frame, 20½ or 22½ inches, for ladies' use. Weight, about 24½ lbs.

ARENA MODEL L is very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.

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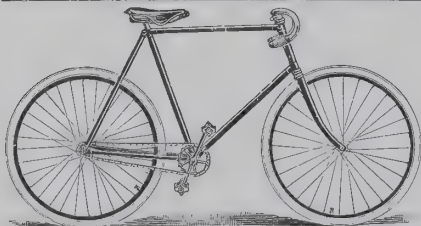


Tribune Model 350. Price, \$75.00.

Model 350 is built for road racing and for all purposes where a light wheel is desired. The frame is built in 23-inch height only. Drop to hanger, 2½ inches; 7-inch cranks; Tribune special single-tube racing tires. Weight, about 21 lbs. Finish, black, gold striped.

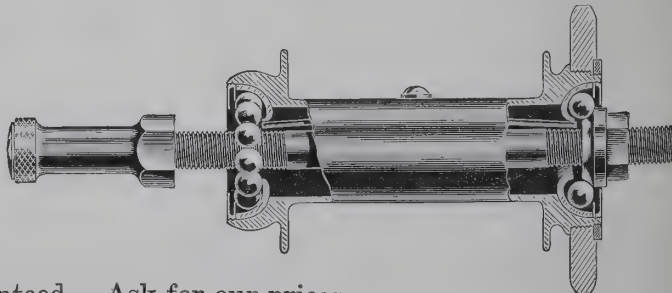
## HUNTER ARMS CO.,

- FULTON, N. Y., U. S. A.



Hunter and Fulton  
Bicycles.

HUNTER HUBS.



Everything we manufacture is strictly high-grade and fully guaranteed. Ask for our prices.





## A Review of the Mechanical Tendencies of 1898 in America.

THE mechanical tendencies of the American cycle-makers and their product for 1898 have been sharp and clearly defined. Indeed, the past year marks the close of a decade of construction of the rear-driving bicycle. The most striking feature of the year in domestic trade has been the effort to introduce chainless rear driving by means of the bevel and other gears. Thus far, however, the chainless types do not appear to have made much headway in popular favor, although many of those made are beautiful examples of the wheel-maker's art.

One of the most prominent tendencies of the season is the dropping of the crank-hanger bracket to a point from 2 inches to 4 inches below a line drawn through the centre of the wheel axles, the average drop on road wheels being  $2\frac{1}{2}$  inches, on light wheels  $2\frac{3}{4}$  inches, and on road-racing and track wheels from these to the extreme limit. This lowering of the crank-hanger bracket has also necessarily brought with it a shortening of the steering head, in order to maintain the top tube horizontal or parallel with the ground.

The use of large tubing seems to have reached its limit during 1897, a majority of the makers now using  $1\frac{1}{8}$ -inch tubing in the front part of the frame. Other makers vary this, of course by using  $1\frac{1}{4}$ -inch tubing in the lower main frame, and in the diagonal stay which runs from the crank-hanger bracket to the seat-pillar cluster; D-shaped tubing, however, is much more largely used than before for rear forks and back stays. Front forks are also largely made of D-shaped tubing.

The use of external reinforcements is not growing, and as the use of large tubing necessitates the employment of flush or invisible joints, in order to make a neat finish, such joints appear to be more largely in vogue than ever. Even the popular-priced models use them largely. Some fear was expressed as to their durability and strength, at the opening of last season, but the makers have now last year's experience to guide them, and may be assumed to know how to make them strong, so that no trouble may be apprehended on that score.

Sheet-metal stampings are used for connections more largely than ever. Many of the detailed parts of these are wonderful evidences of the excellence of the art and show the advanced stages of what might be more properly termed drawing, forming and stamping processes.

In the construction of the wheel hubs, the use of the "barrel" pattern, which has been for several years making its way, is more notable than ever, the old pattern with definite flanges thereon for the spokes having nearly disappeared. This is in good part because the cup-adjustment bearing which requires the barrel hub to go with it has greatly gained ground, a large number of the leading makers having now adopted it for all, or nearly all bearings. Self-oiling devices and hollow axles containing oil and wick are also popular, the old projecting "lubricator," or cup for receiving oil, being wholly extinct. It is safe to say that this is an old device which reversion will never bring back.

The wood rim is the only one used, and is now made thicker through its section and broader across its face, and while it is true that these rims do not now possess the life and resiliency they had when they were made of the thinner section, and narrower, they are now stiffer, truer, and not so liable as formerly to warp and twist or to break in a collision. Originally, wood rims were largely used on account of their extreme lightness. Making them heavier now and painting them in dark colors might suggest a tendency to return to the use of steel rims, it being impossible now, owing to the large use of colored rims, to tell by their appearance of what material they are made. Rims of three-piece or laminated construction are fitted to nearly all of the high-grade wheels, but great improvements have also been made in the one-piece variety.

As in coach and carriage building, black still seems to be the standard

color, but where colors are used many of the makers are enamelling rims to match. Striping seems to have fallen into disfavor, but scroll transfers, with illuminated corners with flowers and colors, appear to have gained a strong foothold.—The New York Commercial Advertiser.

## The Fall in Prices of High-Grade American Wheels.

NOBLESSE OBLIGE evidently seems to have been the motto of every cyclemaker for 1898, for never before have cycles been produced so good in design, style, finish, workmanship, material, staunchness and running qualities. Even the lowest-priced models quoted are superior in these respects to those offered in some previous years, and listing from \$100 to \$125 and \$150, and the riding public is to be congratulated on this fact, because it places the bicycle, the vehicle of modern democracy and personal rapid transit, in the hands of the masses at a popular price, and thus relegates the gaspipe cycle and its maker to well-deserved oblivion.

Undoubtedly the great reduction in price and the great increase in quality, a seeming paradox indeed, are due to what is known as fixity of pattern. Close observers of the trend of the trade and sport say, in addition, that the present conditions and popular prices are caused by the bicycle being no longer a fad of the classes, but a necessity of the masses; that their demand for a well-made and well-known product to meet their wants and purses has caused this reduction to popular price, and that the needs of the makers in order to meet this want have been fulfilled by improved processes of manufacture, increased efficiency of the labor employed, lessened cost of component parts, and other economies of making and marketing, as well as by the increased quantity of the output. This is true of not only the cyclemaking industry, but is also the history of every great American product of manufacture for which there is a great popular demand that leads to competition for popular favor.

## Large French Cycle and Motor Carriage Factories to Be Completely Equipped in America.

THROUGH the organization of a company in France whose object it is to build American motor vehicles and chainless bicycles an outlet has been opened for the sale of several hundred thousands of dollars' worth of American machine tools. There is now on the market, subject to bidding, a list of machine tools aggregating about \$100,000 in value. This is only a starter and will not half fill the works. When the entire organization is complete there will be two companies formed. One company will be for the manufacture of the vehicles and the other for the sale of the product. The manufacturing company has already been formed, and has at its head one of Europe's most influential financiers, Mr. Clement, of France. The company is known as Les-Usines-Clement. The company to control the sale of the product has not as yet been formed.

A very large plant, the main building of which is 800 feet long by 400 feet wide, and of most modern construction, has just been completed at Levallois on the Seine, directly outside the fortifications of Paris. This building is constructed much like the Government buildings surrounding it, a French Government architect having designed it. It is in this building that the American machine tools will be set up. The machinery will be operated by electricity. Two 500 horse-power engines have already been purchased in Europe. They will be directly connected to generators which will be wired to motors, one of which will be situated at the end of each line of shafting. The electrical machinery and shafting have also been purchased and are being set up in anticipation of the arrival of the machinery. Both the motor vehicles and the bicycles to be manufactured in these works will be of American invention, the new company having convinced itself that types of each that it found manufactured in this country and effectively covered by patents abroad were the best yet invented.

**A Hint to Importers of Bicycles.**—In France there is going to be a big demand, almost immediately for ladies' bicycles. Fashion has changed. The French women cyclists have worn bloomers and have ridden men's machines. At last they have discovered that bloomers look odious and that their English and American sisters who ride women's machines and wear becoming women's cycling costumes are far ahead of them in appearance on the wheels. Soon the bloomers will, we think, disappear from France and importers should take care that they look after the new business in ladies' machines there. A similar tendency is certain to develop wherever the use of "Diamond frames" for women has been in vogue, and importers and bicycle buyers generally should be ready to meet the altered demand.



### Tires and Saddles During 1898.

THE field is still contested between the double or inner tube and the single tube or hose-pipe tire, and at times leading makers of each have claimed that their class were used on two-thirds, or thereabouts, of all the cycles made in America. The regulation size for full roadsters is  $1\frac{1}{8}$  inches in either class. The most popular at present are tires having a serrated or corrugated tread. There are, of course, a great many variations in surface in tires with rough treads, and also of smooth-tread tires. Very few marked novelties in tires have been seen in the market—quite in contrast with one and two years ago. Average weights are at present about 4 pounds to the pair.

Saddles may be divided pretty accurately into three classes. First, those having a fixed and unyielding metal base and a short pommel, which is not intended to be touched by the rider's body, the seat portion being fitted with raised pads; second, saddles with a fixed base of either wood or metal, the edges being inflexible, but the ease of use depending upon a more exact shaping of the whole, this form of saddle being sometimes varied by being slightly padded near the cantle or back edge, or either padded or inflated at the pommel; third, the saddles which are made by lacing firmly from cantle to pommel, the lacing being then provided with a flexible leather cover. The last named, which is a popular type, is also varied by having pads built on it, and the varieties of saddle under these three types are so great and so different that almost every peculiarity and whim of the rider ought to be met and satisfied this year.

### Inserting Washers in Bicycle Rims by Machinery.

A MACHINE has been invented and is in successful use in this country that does away entirely with human skill in one portion of bicycle construction. Its task is the insertion of washers into wood rims, and it far surpasses anything human in the rapidity with which it does its work, 40,000 to 50,000 washers per day being easily set in rims by machine.

The washers are furnished to the consumer strung on wires carrying 500 washers; these are all strung with the teeth standing in one direction so that when they are threaded onto the feeding wire of the press they are ready for delivery to the rim.

The feeding wire is inserted at the top of the machine, passes down through a shuttle, the end of the wire terminating just over the pilot pin of the turret. As the slide with the turret ascends, the shuttle is opened and the washer drops onto the pilot pin; as the slide descends, the turret is revolved one-sixth of a revolution, the retaining finger drops by gravity over the pilot pin and holds the washer in position. The rim is placed onto the bearing shoe, which is made adjustable for different thicknesses of rims, and which is supported by a spring, the tension of which can be regulated anywhere from 100 to 800 pounds, according to the pressure with which it is desired to force the washer into the rim. The operator places the rim on the shoe with a hole directly under the pilot pin; as the slide descends the retaining finger is moved to one side just as the pilot pin enters the hole in the rim, the washer drops into the countersink and the plunger in the turret sets it firmly in the rim.

As the turret ascends it is revolved at the same time and comes in position for the next insertion; in the meantime the operator moves the rim along the position of one hole, moving the bottom of the rim first in and then out from a perpendicular line. The pilot pin in the turret as soon as it strikes the hole guides the rim to the proper position to make the washer stand square with the drilling.

It does not require a skilled operator to string the washers onto the feeding wire or to move the rim so it comes in position for receiving them; a boy will soon get this learned so that washers can be put in at the rate of 70 per minute, which is equal to 42,000 in ten hours or about 1,400 rims. This brings the cost of inserting washers down to the lowest possible figure, reducing it in some instances as low as  $1\frac{1}{2}$ ¢. per thousand washers. It is just such economies as this that has placed the American cycle-maker ahead of all the world.

**Machine Tools in Europe.**—No wonder that the European is amazed at what is accomplished with our machinery; for instance, bicycle machinery, of which so much has of late gone abroad. In one shop where the usual time required to finish a certain piece by their old method was ten hours, it was found that on the American lathe the piece was equally well finished in thirty-nine minutes.

### American Goods in Switzerland.

THE following are some of the articles of American manufacture and production that have found their way to the Swiss markets since July 1, 1897, as reported by the United States Consul-General at St. Gall. The list is especially interesting as giving some idea of the great variety of these exports:

#### AMERICAN EXPORTS TO SWITZERLAND.

Lumber and logs in cargo lots.	Cast iron, porcelain-enamelled sanitary appliances, as bathtubs, lavatories, sinks, water closets, etc.
Woodworking machinery and tools.	Steam, water and gas fittings.
Ironworking machinery and tools.	Steel and iron tubes.
Lathe and shapers.	Steel ceilings (trial order).
Emery wheels.	Ladies' and men's shoes.
Railroad iron.	Sole and other leathers.
Iron wheels and wheelbarrows.	Machinery belting, leather and rubber.
Roller-top desks and other office furniture.	Pianos (to a small extent).
Cigarettes.	Organs.
Smoking tobacco.	Patent money drawers.
Raw tobacco.	Cash registers.
Ironing machinery for laundries.	Provisions (hams, sides, lard, and Salsami and other sausages).
Agricultural implements.	Cotton-seed oil.
Agricultural machinery.	Standard Company coal oils.
Phonographs (Edison's).	Raw cotton.
Ice-cream freezers.	Inkstands.
Arms (rifles and revolvers).	Photo library paste.
Road carts.	Inks and mucilage.
Wagons and carriages (but few).	Bicycles, tires and other accessories (all of the best makes are represented in Switzerland).
Dump Wagons.	Typewriters (different makes).
Steel for drilling purposes.	Collars, cuffs and shirts.
Picks and shovels.	Writing, bond and ledger papers.
Tools of all kinds.	Blotting paper.
Street-sweeping machines.	Coffee mills.
Rubber goods.	Corn-cob pipes.
Canned vegetables.	Photographic supplies and apparatus.
Canned fruits.	Tubular lanterns.
Dried fruits, all kinds.	Picture hooks and wire.
Honey.	Picture frames and moldings.
Pampas plums.	Furniture and other hardware.
Wines.	
Wheat.	
Mustard seed.	
Grass seed.	

### A Year's Shipbuilding.

THE impetus which has been given of late to the shipbuilding industry of this country gives especial interest to the report of the Bureau of Navigation, just issued, for the fiscal year ended June 30, 1898. The report shows that during the twelve months there were built and documented in the United States 952 mercantile vessels of 108,458 gross tonnage, compared with 891 vessels of 232,233 gross tonnage for the preceding fiscal year. The decrease shown last year was almost wholly on the Great Lakes, where the tonnage of new vessels amounted to only 54,084 tons, compared with 116,937 tons for the previous twelve months. On the other hand, the construction on the Pacific Coast increased from 7,495 tons in the fiscal year ended June 30, 1897, to 49,789 tons last year, this increase being chiefly in steam vessels designed for the Alaska trade. The decrease in the past fiscal year's construction was entirely in the first half of the year—April, May and June—the tonnage built in the United States was double that of the corresponding months of 1897.

The tonnage built and officially numbered during the first quarter of the current fiscal year ended September 30, 1898, comprises 301 vessels of 83,191 tons, compared with 97 vessels of 26,805 tons for the corresponding quarter last year. Indications are that construction during the current fiscal year will be greater than any annual output for twenty-five years, except 1890-91.

**Is New York to Have a Mammoth Shipyard?**—The most interesting event of the month was the persistence in the rumors regarding that new shipyard which may some day be established in the vicinity of New York. The latest talk in the street puts it that parties are now invading Staten Island in view of finding a good site for the proposed yards. It is stated that \$10,000,000 will be put in the work, and in connection with it are mentioned the names of Andrew Carnegie and several other prominent capitalists. As yet nothing positive has been published. It looks very much, however, as though some one was taking the matter seriously, and although no one is willing at present to commit himself, the chances are that the project is now assuming definite shape.



# BICYCLES!



## "ILLINOIS" BICYCLES.

Best bargains offered  
in Bicycles for 1898.

Spiral Screw Drivers.

Reversible Bit Screw Drivers.

One Hole Hand Corn Shellers.

Waffle Irons.

Serrated Edge Knives.

WE ARE THE WORLD'S HEADQUARTERS  
FOR THESE GOODS.

Paring Knives.

Mincing Knives.

Meat Tenderers.

Can Openers and Hardware Specialties.

SEND TO ANY EXPORTER IN THE UNITED STATES, OR TO US  
DIRECT FOR OUR 1898 ILLUSTRATED EXPORT  
SPECIAL, GIVING NET PRICES.

## ILLINOIS CUTLERY COMPANY,

Decatur, Ill., U. S. A.

## 3,000 Bicycles,

Surplus stock of high-grade '98 models,  
must be sacrificed. Strictly up-to-date  
guaranteed machines worth \$30 each;

Our price,  
to close out, **\$16.00**

Complete; choice of style.

Sample shipped on approval to any part  
of the world on receipt of \$5 deposit, or  
send order through any reliable commis-  
sion house.

References: First National Bank, Chicago;  
Geo. W. Sheldon & Co., Exporter, New York.

G. B. MEAD CYCLE CO., Chicago, Ill., U. S. A.

Cable address: "MEAD CYCLE," Chicago. A B C Code.



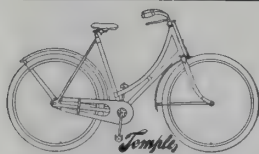
## PATENT EXPANSION STEM,

Patented July 20, '97.

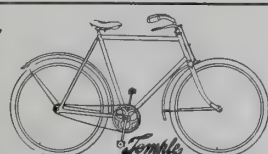


This is our New Double Adjusting  
Stem for which there is an enormous de-  
mand. It does away with the head  
clip and adjusts the bar and also the  
stem in head by tightening the nut on  
the top. It improves the looks of wheel  
and makes it very effective. It is made  
in two lengths, 3 and 5 inches; diameter of stem, 13-16 and 7-8 inch. These are made of the best  
Carbon Forged Steel, and are guaranteed in every way. Catalogue on application. Orders filled  
through commission houses.

IDEAL PLATING CO., BOSTON, MASS., U. S. A.



# Temple



Temple Scorcher. Discount to agents, 50 per cent. List price, \$75  
Temple Special. Discount to agents, 45 per cent. List price, \$60  
Temple Superb. Discount to agents, 40 per cent. List price, \$50  
Temple Faultless. Discount to agents, 35 per cent. List price, \$35

Best and cheapest line of Bicycles made in America.

Machines for Ladies the same price as for Men's.

Fitted with the best Saddles, Pedals and Tires.

Spanish Catalogues, and all letters written in Spanish.

TERMS: Cash in "New York" or "Chicago," to be paid us on delivery of complete  
shipping documents. Bicycles will be placed F. O. B. steamship at New York if  
desired, at no extra cost. "Send us sample order."

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CHICAGO, U. S. A.

## THE GLOVER PERFECTION.



Designed with special regard for  
conformation to the human body  
in the sitting posture. Recom-  
mended by physicians.

Flat Coil Steel Spring.  
No Rebound.  
No Pressure on Soft Parts.  
Cool. Comfortable.

RETAIL PRICE, \$3.50.

Send for free descriptive  
circulars to



GLOVER CYCLE SADDLE CO., Jackson, Mich., U. S. A.

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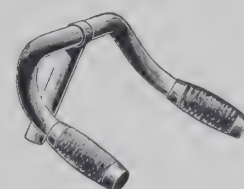
Best Nickeled over Heavy Copper.  
Made 7-8 Tube Tops.



PRICES, WITHOUT GRIPS, F. O. B. NEW YORK.

Upturned, one doz. lots .....\$10.50  
Drop, one doz. lots..... 10.50  
Octagon Tube, extra, per doz..... 3.00  
"Schinnerer" Bars, extra, per doz..... 1.20  
One-inch Tube, extra, per doz..... 1.20  
Ram's Horn, one doz. lots..... 11.50  
Adjustable, one doz. lots..... 13.50  
Anti-Vibration, extra, per doz..... 3.00  
Seat Posts, per doz..... 3.60

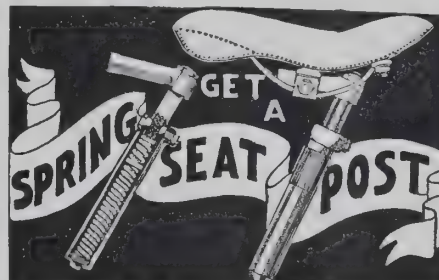
Any size stems. Discount to the trade on 100 to 50,000 lots.



Chicago Handle-Bar Co., 34 & 36 Market St.,  
Chicago, Ill., U. S. A.

## BERKEY'S ADJUSTABLE SPRING SEAT POST

Solves the Problem.



No bicycle complete without it.  
It will prolong not only your own  
life, but life of your wheel. Lateral  
motion obviated by tightening  
screw. In ordering give exact size  
of seat post hole. Will fit any wheel  
and saddle. Send for circular and  
prices. In ordering through export  
commission houses send us dupli-  
cate order.

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Akjustable Spring Seat Post Co.,  
GRAND RAPIDS, MICH., U. S. A.

## 2,000 '97 and '98 Model Bicycles

MUST BE CLOSED OUT  
REGARDLESS OF COST.



**\$13.00** and  
Upward.

Write for particulars.  
Most complete line in America.

In sending orders through export houses send us duplicate.

THE BROWN-LEWIS CYCLE CO., 300 Wabash Avenue,  
CHICAGO, ILL., U. S. A.

## No More Rust.

Our "Three in One" Lubricant  
Contains no Acid.

Prevents Rust on All Metals.



The only perfect Lubricant for Bicycles, Guns, Sewing Machines,  
Reels, Etc. Never gums or hardens. For cleaning Bicycles or  
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and clean to use. Correspondence solicited. Send for Catalogue  
"C." Order through Export Commission Houses in this country.  
Manufactured by

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"THE FINEST ON EARTH."

That's a broad claim to make for  
anything, but in the case of the

## MANSON 3 CROWN

MODEL 33

it's but the simple truth, and there is no  
need to deviate from the truth.

The Several Reasons Why?

It is made of the very best  
material.

It is new and novel and  
eminently practical.

It has two rear crowns to  
match the front fork  
crown, causing the ma-  
chine to be absolutely  
rigid.

It has an eccentric bracket  
at the hanger which fa-  
cilitates the adjustment  
of the chain without  
using the rear chain ad-  
justers, and is fitted with  
the one-piece Fauber  
crank.

The Thor Hubs are used  
and recognized every-  
where to be the best.

The best swaged spokes,  
14x16 size, are used.

Laminated or one-piece  
selected rock-elm rims,  
1 1/4 or 1 1/2, 28-inch wheels,  
drilled 32x36.

The Peacock or Baldwin  
adjustable chain.

Head set, turned from bar  
steel, drop forging con-  
nections.

Seamless tubing through-  
out.

Dunlap tires.

Steel adjustable handle  
bars.

Christy saddles.

Record pedals.

Finest nickeling and enam-  
eling that can be put on  
a bicycle.

Frames, 22 and 24 in. high.

Weight complete, 24 lbs.

Choice of gear.

Ladies' frames are made  
same as gents, with ex-  
ceptions of drop bar and  
chain guards. Height,  
20 and 22 inches.

THE PRICES—\$75 less 33 1/3 and 5 per cent., delivered f. o. b. New York.  
MANSON CYCLE CO., 73-75 West Jackson St., Chicago, Ill., U. S. A.  
Cable Address: "Manson."



### Typewriter Ribbons.

PERHAPS no part of the typewriting machine's equipment has given greater perplexity to its promoters than the ribbon. To obtain one that would not clog the type or smirch the paper, and from which the ink would not evaporate when exposed to the air, was a difficulty with which operators had to contend and which inventors tried hard to remedy. It is only within the last two years that ribbons have been made which appear to satisfy the general demand. While ribbons have been required since the time of the modern typewriter's introduction, it is in the last ten years that the business of making them has reached its greatest proportions. Four years ago it was said that this kind of ribbon-making was engaged in by at least forty manufacturers in the United States, and their output was estimated to be not less than 600,000 ribbons annually. To-day the annual production is probably more than twice as large as it was then, and makers declare that they are kept very busy filling their orders. The thousands of American typewriters in use abroad are practically all supplied with American ribbons, and, as the average life of a ribbon is only about four weeks, their exportation constitutes an important branch of the business by itself.

Ribbons are made in almost every conceivable color and variety, and with copying and non-copying ink. Their length and width depend upon the requirements of the machine for which they are intended. The average length is 8 yards, although a few are made as long as 18 yards. Some ribbons write in one color and show an entirely different color when the writing is copied with a letter press. A ribbon which writes black may copy blue or green, making the record much more clear on certain kinds of paper than it would be if made in black. The head of the ribbon department of a large typewriter house on Broadway recently gave some facts concerning the extent of the business in question and the skill and care required in its prosecution.

"Here in New York," said the manager, "there are probably 500 places where typewriter ribbons are sold, while in all the cities of the Union there are many thousand. Some of the dealers handle eight or ten different styles, and the amount of their monthly receipts is often very large. The different makes of ribbons in the market number from fifty to seventy-five, and most of them are manufactured here in the East. I estimate that the number of ribbons used in a year ranges from 1,000,000 to 1,500,000. There is good reason to suppose that there are between 300,000 and 350,000 ribbon-using typewriters here and abroad, but, of course, some of the machines are not employed actively. I should say that fully one-third of the ribbons we make are exported, and there are also other manufacturers who export large quantities.

"Only persons connected with the business can understand how much care and expertness are necessary in turning out ribbons which will give good satisfaction. It is an easy matter to succeed in making a good ribbon now and then, or perhaps several dozen good ones, but that won't do; every single ribbon must be strictly 'O. K.' or else complaints will surely be made, and the manufacturer will suffer in consequence. The effect produced by one poor ribbon might mean the loss of several customers who would be misled as to that particular brand.

"One of the chief aims of the manufacturers is to produce a ribbon which will leave a permanent impression on the paper. Ink which has lamp-black as a base is always permanent; it cannot be extracted by acids and will not fade by long exposure to the light. The ribbons in most common use are the black copying, purple and purple copying, and a record made by any one of them may be regarded as absolutely lasting. Many of the best ribbons have selvaged edges, which prevent their ravelling and curling when in use. They are nearly uniform in thickness, though some ribbons are made of very thin texture for use when a large number of copies is desired.

"The cloth of which the majority of ribbons are made is a very fine quality of 'jaconet' or nainsook, most of which comes from England and Germany. The ink is applied by means of rollers and is forced between the fibres of the cloth by revolving brushes. Then the surplus ink is absorbed, different methods being employed to accomplish that purpose. Each maker has a secret process for producing his individual ribbon, and the secret is guarded with the greatest possible care. The foreman of a ribbon factory is the only man there who knows the exact formula for mixing the powder or pigment used in making the ink; all the other employees do as they are directed by the foreman or by printed instructions.

"It is the rule in making ribbons to apply the ink to both sides of the cloth. One manufacturer, however, inks only one side, saying that ribbons inked in that way do not clog the type so often as those which are inked on

both sides. His assertion might be true if the clogging were caused solely by the ink, but it isn't. Little particles of the cloth are being detached constantly, which work into the type, and whether ink is present or not, the letters are bound to be filled occasionally.

"An effort has been made in Germany to make ribbons which would take the place of those imported from America, but the German manufacturer failed to induce the trade to accept his product. It will be a long time before our foreign friends are able to bring out ribbons which will supplant those made here, and our manufacturers have little cause to fear competition from that source."

### The Industrial Outlook.

SIX months or less of the present year have been perhaps the most prolific of momentous events in our whole history, and the events in succession have wrought an astonishing transformation of our national attitude and outlook. The unexpected has happened to us with rapid repetition. We have received added assurance of the flawless solidity of our internal structure, and we have taken the measure of our high stature among the nations of the earth. Without a thought of boasting, the promise of national growth and greatness was never before comparable with that of to-day. Everything is going our way, and there is no seriously disturbing influence in sight. In wheat and cotton, in coal and oil and iron, we make the price for the markets of the world, and we are the most increasingly prolific producers of the staples of life.

But above all the producers of the crude materials upon which the life of the civilized man depends are those who shape the materials for his specific uses. The manufacturing nation is *the* nation, and this we are with increasing pre-eminence. While the products of our mines and of our fields are greater for each succeeding year, the output of our shops and of our factories grows with more wonderful rapidity. What is of the greatest importance in maintaining the balance of our industrial life, our consumption also, our absorption by use and enjoyment of the goods produced, grows also with the rest, and especially is this growth active at present. Wheat is high, and in the prosperity of the farmer we have increased demand for all our best products at home. Our own borders also are extending, the market is commensurately increasing, and a broader range is given to the variety of products to be exchanged, and of goods to be distributed. The foreign markets are rapidly opening to us. We are cheapening and improving our goods and learning the ways of outside trade, so that soon the people will be hard to find to whom we cannot sell at their own price.

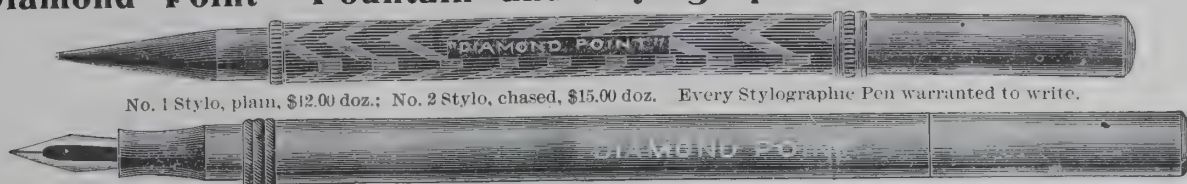
We are going to be busy for years. We are going to be too busy to be soon or easily involved in frivolous or disheartening political experiments. We are in a position where we can ask little of Government, and where Government can do little to help us except to look on at our orderly activity, and maintain friendly relations with all peoples.

This all means, if it means anything, that machinery and machinists, that all who have to do with the production or operation of machinery are to be active as never before. Nothing now goes except as it is driven by steam or water or one of the still minor motors, and nothing is done, however intricate, but the finger of machinery is employed. The increasing employment of machinery and its widening application are a constant wonder. The constant supersession of machinery by improvements upon itself, so that it may almost be said that no modern machine has ever a chance to wear out, is also to be noted. If any man should be sure of a job for years to come, and should experience the highest expression of appreciation in having constant employment, it should be the machinist. Shops come up and shops go down, but the shops where machines are built cannot perish from the earth. It is now likely to be more active and healthy than ever in its life before.—*The American Machinist.*

**American Nuts and Bolts.**—A South Staffordshire factor, visiting Glasgow a short time since, saw an invoice of nuts and bolts made by an American firm at 20 per cent. below the price quoted by makers in Birmingham and Darlaston. The invoice was for a large quantity—about 100 tons—but there was nothing to indicate that the price charged was the result of any special bargain.—*The Hardwareman, London.*

**American Tools in Germany.**—German manufacturers, ready to grasp every opening for improving their plants or their methods, are calling for American superintendents, draughtsmen and foremen, and are showing that they are fully alive to the American mechanical superiority. A mammoth plant has been erected in Berlin for the manufacture of tools after American patterns and according to American methods.



**"Diamond Point" Fountain and Stylographic Pens and 14-kt. Gold Pens.**

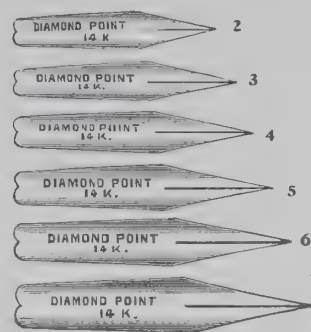
No. 1 Stylo, plain, \$12.00 doz.; No. 2 Stylo, chased, \$15.00 doz. Every Stylographic Pen warranted to write.

No. 101 Fountain Pen, plain, No. 1 Pen, \$12.00 doz.  
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Every Fountain Pen is fully guaranteed and has 14-kt. Gold Pen. Box, Filler and Water Ink Capsules to last one month, with every Pen. Water Ink Capsules, extra, 60c. dozen boxes, enough for one year for pen and inkstand. Use with water only. Always ready for use. No ink to dry up in tropical climates. Pens or Ink in quantities of 1 doz. or over, 40 per cent. discount. Special prices in gross lots. Order through your commission house, or send remittance with order. Any special name on boxes and holders if ordered in large quantities.

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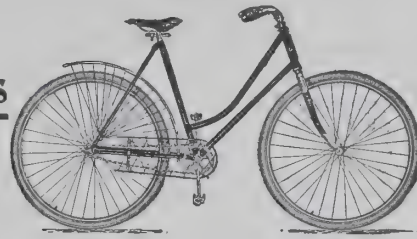
No. 2—14-kt. Gold Pen, \$1.00 each.  
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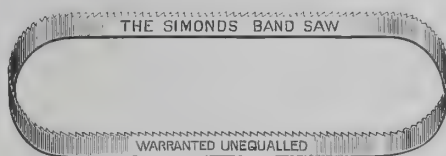
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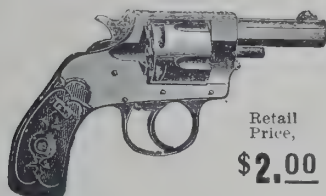
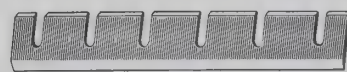
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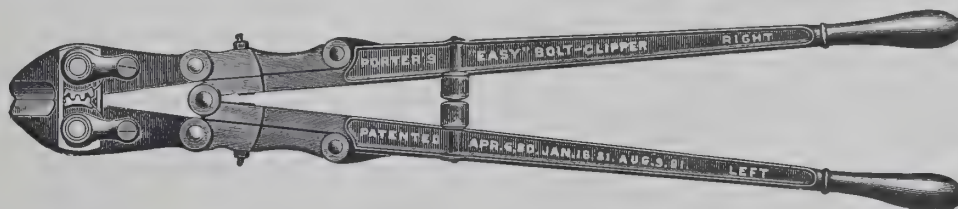
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FACILITIES: The most improved machinery, artistic designers, skilled workmen.  
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### The Manufacture of Mirrors in the United States.

THE sales of looking glasses in the United States amount to about \$8,000,000 a year, and the industry gives employment to more than 2,000 persons (very few women or girls among them), about one-half of whom are in the State of New York. Mirror-making is a simple process, but though simple, is not without its elements of danger. The present method is as follows: A smooth stone table is arranged to be easily canted a little on one side by means of a screw set beneath. Around the edges of the table is a groove in which mercury may flow and drop from one corner into bowls. The table is first made perfectly horizontal, and then tinfoil is carefully laid over it, covering a greater space than the glass to be coated. A strip of glass is placed along each of three sides of the foil to prevent the mercury from flowing off. The metal is then poured from ladles upon the foil till it is nearly a quarter of an inch deep. The plate of glass is slid on from the open side, and its advancing edge is kept in the mercury, so that no air or floating oxide of the metal or other impurities can get between the glass and the clean surface of the mercury. When exactly in place it is held till one edge of the table has been elevated ten or twelve degrees and the superfluous mercury has run off. It is left for several hours and then placed upon a frame, the side covered with the amalgam, which adheres to it. After the amalgam becomes hard the plate is ready for use. The dangers arising from mirror-making come chiefly from the use of the quicksilver, and there is a general belief that this occupation is especially injurious to health in consequence of the danger of poisoning from the fumes, but it is not sustained by the figures collated by the insurance companies.

New York had at the time of the last Federal census twenty-six mirror-making factories. Illinois had seven. Pennsylvania five and Massachusetts two. Louisiana had at that time the only factory of the kind in the South. California the only one on the Pacific. Quicksilver being extensively used in mirror-making, the facilities which California has for its supply would seem to give that State a decided advantage in this particular line of trade. About one-quarter of the quicksilver produced in the world comes from California.

It is a theory which has been generally accepted, but the error of which is obvious to every intelligent and dispassionate observer, that men are regardless of mirrors and that women are their chief users. The fact is that a very considerable number of mirrors are bought for and are used by men, and to that fact is due the extent of the business, probably, for it would be difficult to believe that 20,000,000 girls and women require \$8,000,000 worth of mirrors every year, mirrors being seldom lost and never broken—intentionally. The excellence of American mirrors is generally acknowledged.

### How Veneers Are Made.

VENEERS are cut from almost all the finer woods, both native and foreign, including mahogany, birch, rosewood, ebony, satinwood, cedar, tulipwood, Hungarian ash, sycamore, and others, veneers being used on pianos and other musical instruments, on furniture, doors, and so on. Some veneers are sawed and some are cut from the log by means of a knife. The sawed veneers are the better and more desirable, and they cost twice as much as cut veneers. More cut veneers are used, however. Twenty years ago 75 per cent. of veneers was sawed and 25 per cent. cut; but now these percentages have been reversed. Some woods can be worked for veneers under the saw only; some can be either sawed or cut, and of such both kinds of veneers are made; but there are woods that practically are made in knife veneers only. The veneers made in this city are chiefly of the various kinds of mahogany and other imported woods; the veneers from native woods are mostly produced in the West, in mills located near the forests from which the woods are taken.

Veneers may be made of almost any degree of thinness, as, say, one one-hundredth of an inch. They are most commonly made for the many uses to which they are put, in sawed veneers of a thickness of twenty-six to thirty to the inch, and in cut veneers of a thickness averaging thirty to the inch. Of sawed veneers of such thickness but twelve to thirteen can be produced from an inch of solid wood; the rest is lost in sawdust. There is no waste of material in making cut veneers. Sawed veneers are cut, a single sheet from the log at a time, by a circular saw of between 5 and six feet in diameter, of a kind specially made for the purpose. The inner side of this saw, that is, the side toward the body of the log, is flat; the outer side of the flange which is the disk of the saw, to which the teeth are attached, is made slightly concave, so as to throw the veneer a little clear of the saw as it comes along; if

it were permitted to hug the saw, the thin sheet of wood would be burned or scorched by the friction. The saw is, of course, adjusted to run with the greatest nicety, and the squared log that is to be sawed into veneers is rigidly secured to the frame that carries it to the saw.

The cut veneers are shaved off on a simple but powerful and costly machine called a slicer, in which the log, securely held on a moving frame, is brought against a knife held rigidly. The knife of a slicer is perhaps 17 feet in length, made in two parts each  $8\frac{1}{2}$  feet in length, but perfectly joined, making one continuous knife 17 feet long. The knife is set horizontally, edge upward, in the face of what is called the knife bed, which is a ponderous casting immovably set. Extending along over the top of the knife bed, and above the level of the knife edge is a massive casting called the cap. Attached to the front of the cap, horizontally, just above the knife edge, parallel with it and adjusted at a line back from it the thickness of the veneer that is to be cut, is what is called the pressure bar. The knife and the pressure bar, so held, constitute in effect a gigantic plane, which is not moved to cut the thick shaving that it is made to produce, but which is held securely while the log from which the shaving is taken is brought against it. The squared log from which the veneers are to be cut is rigidly secured horizontally by means of clamps to the face of what is called a staylog, this being in effect a log frame that is placed not horizontally, but with its face in a vertical position and opposite to that part of the machine in which the knife is held. There are slats along in the staylog, at the top and bottom of which are clamps that are moved in their openings as may be required to clutch and hold firmly the log stretched along its face. The staylog moves in a vertical plane, but in a diagonal direction, on heavy slides.

Motion is communicated to the staylog by means of an arm attached to a rocker shaft, which thrusts the staylog upward and pulls it down on the slides with regular alternations. The motion of the staylog being diagonal in its direction, the wood is brought against the knife with a slicing movement. The staylog is adjustable with relation to the knife by means of a wheel something like a steering wheel, set at one end of the staylog apparatus. To one unaccustomed to it the operation of the slicer seems almost marvellous. The staylog is thrust upward on the slides and drawn downward about as rapidly as a man would work a jackplane.

### A Refrigerator That Can Be "Knocked Down" for Export.

A REFRIGERATOR for export that can be shipped "knocked down" to save ocean freight and storage space in warehouses has long been wanted. The difficulty has been to make a box that would be water-tight to hold the ice, and at the same time be loose in all the joints. This obstacle has been overcome in a type of refrigerator that has just been patented and placed upon the market. It consists of a removable knock-down ice chamber.

The bottom pan of this chamber is stamped from a sheet of galvanized iron so that the rim turns up  $\frac{3}{4}$  of an inch high all around. As it is not soldered at the corners it will never leak. In the centre of this pan is an opening for cold air to pass through which has a raised flange around it to keep the water out. The side walls of the removable ice box are also made of galvanized iron, and have grooves in which the front and back pieces slide. All four set inside the bottom pan so that all the meltings of the ice would be caught by this pan and turned into the waste pipe, which starts just below the pan when the refrigerator is set up. In other respects this refrigerator is representative of the best and latest American practice in refrigerator-making as regards ventilation, etc. The outside of the case is made of ash, to which are attached two layers of wool felt and two of charcoal sheathing. On this is nailed an inside lining of spruce,  $\frac{3}{8}$  of an inch thick, and this, in turn, is covered with zinc. The four sides go together in V-shaped joints, and are held together by screws. They are very easily set up as the doors and lids are already fitted and hung. Altogether, the "knock-down" idea, which is a new one in export trade for these goods, seems to be very fully and successfully worked out.

**An English View of American Competition.**—With regard to the competition specially of American engineers with those at home, it is a remarkable but a stubborn and incontrovertible fact that the question of delivery is killing annually millions of pounds' worth of home manufactures. Many London consulting engineers, we regret to say, advise their firms to send inquiries to America, whence deliveries can be got sooner than from home works, and, what is more, can be got at fixed dates. Our English engineers need, as Americans do, to insure deliveries promptly and by the dates promised.—*The Hardware Trade Journal, London.*



**TRENTON WATCHES and CYCLOMETERS** give universal satisfaction. Various sizes and grades of watch movements and complete watches, with cases of numerous characters, and several styles of Cyclometers, suit all requirements. Prices to the trade upon application.

Duplicates of orders given commission houses should be sent direct to factory.

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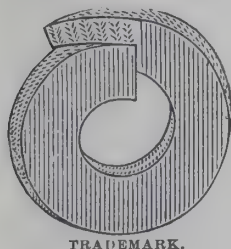


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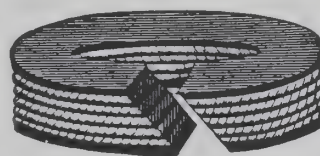
IN ORDERING, GIVE EXACT DIAMETER OF STUFFING BOX AND PISTON ROD OR VALVE STEM.  
**SELF-LUBRICATING, STEAM AND WATER TIGHT.**

Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. EVERY PACKING FULLY WARRANTED.

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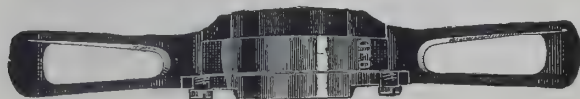
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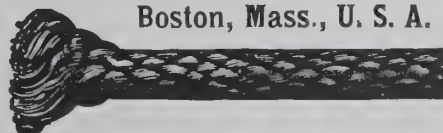
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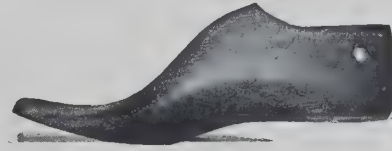
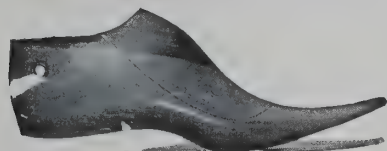
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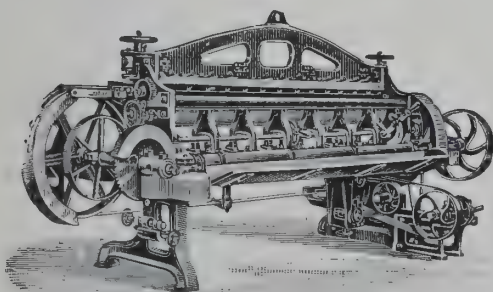
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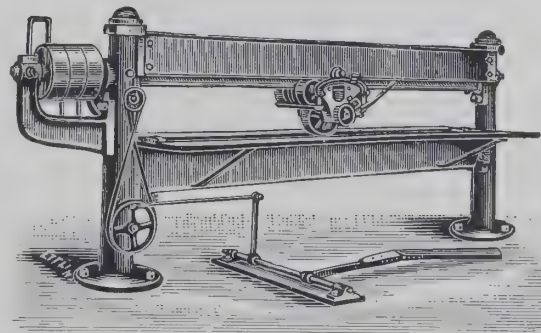
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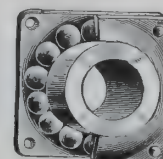
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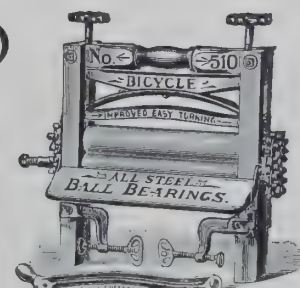
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Special attention given to export orders.

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**SPECIAL HIGH-GRADE ROLLS.**







*Devoted to the Foreign Trade in Electrical Appliances.*

### The Success of the Open Conduit in New York City.

ABOUT one year ago the Metropolitan Street Railway Company started the active construction work of a complete open conduit electric traction system to be extended eventually over all of its routes. Rather than delay the operation of the lines electrically until a power generating and distributing system of the enormous magnitude necessary for driving such a load could be constructed, the company installed two temporary power stations. The apparatus in these temporary stations, aggregating a generating capacity of almost 10,000 horse-power, will only be in service about a year and then discarded, and its place occupied by rotary converters taking power from the high-tension alternating system. The temporary equipment is of the most thorough and reliable type, no cheap work being allowed even in this case where, if anywhere, economy of first cost might be considered advisable. The most interesting feature of it all is that the company should see fit to install such an expensive equipment, against a large part of which depreciation of 100 per cent. must be charged and a very large percentage even on what can be sold, its only return being the increased business for one year over that obtained with the former equipment of horse-power, and to a certain extent the goodwill of the public.

The increased business due to the improved nature of the service has been most astonishing in its magnitude, even to the officials of the company themselves, although they have had previous experience in the re-equipment of horse-car lines with cable apparatus. Where small horse cars jogged along with a fair patronage, double-truck electric cars of twice the capacity, twice the speed and one-third the headway are crowded to their very limit. The company has met the public's demands by constantly adding to the service, putting on cars as fast as they could be built and equipping and loading up every new generator to its limit as soon as it was ready to run. The improvement in service is so great that the public has insistently demanded the change on other lines, and two such lines reaching the shopping districts are now about ready to go into service. The mammoth units of the permanent power station will not be ready for service in time to carry the heaviest Winter load and two 850-kw generators are now being hastily erected in a temporary location to help the temporary stations, but even with them it is apparent that little electrical car heating can be done during the rush hours of the Winter, and the generating stations are going to be pretty well overloaded from dawn till midnight. The traffic has largely come, of course, from the Manhattan elevated, the accessibility of the surface lines, the extensive transfer privileges and the perfection of the service generally taking from the overhead system practically all of the short-haul business, leaving it only the long-distance traffic, in which its higher speed is of greater value.

Mechanically and electrically the conduit system on these lines has been proven an unqualified success. Troubles with the plows and underground rails are much less frequent than with the overhead pole and trolley wire. The nuisance of the trolley slipping off has no equivalent disadvantage in the underground system, the plow of which requires no attention whatever on the road. It must be confessed, however, that when accidents do occur to conduit apparatus they are likely to be more disastrous than cases of trouble with the overhead trolley. If the latter becomes deranged or broken it is readily pulled down and the car pushed or pulled in by another, but accidents to the plow of the underground system are likely to choke up the conduit or wedge parts tightly in the slot and to require considerable work to clear the line again for operation. No trouble has been experienced from water or snow and apparently but little trouble from spreading of the conductor rails or failure to make contact from any cause. An incidental advantage of the conduit system of no little importance is the solidity of the roadbed, due to the depth and massive nature of the concrete conduit walls, which with the yokes form a most perfect foundation for the track. A feature of the switches and crossings from which some trouble might have been anticipated is the necessary break in the continuity of the conductors, cutting off power from the car for short distances at these points. To be sure this is somewhat of a nuisance at night to passengers who are reading,

as the lights go out with annoying frequency on a complicated crossing. The attention of the motorman is also distracted to a certain extent from his other cares at these points by the necessity of turning off the power before his plow reaches each such break and turning it on immediately after leaving the break, and of preventing his car from stopping in the open circuit position, in which case it could not again be started. This requirement, however, seems to give no trouble in practice.

### Electric Door Openers for Elevators.

PNEUMATIC door openers for high-class elevator installations in the most modern office buildings are now quite common, and it may very likely have been a cause of wonder to many electrical engineers that something in the way of an electric door opener has not been developed for the same class of elevator service. As to the time-saving qualities of the pneumatic door opener, there is no longer any room for doubt. From two to three seconds are saved, at least, every time the car is stopped to let on or discharge passengers, and this is an advantage by no means to be disregarded in modern office building service where it is desired not only to get as much good as possible out of each elevator car, but also to land passengers as expeditiously as possible. Nothing adds more to the attractiveness of an office building from the tenant's standpoint than a rapid elevator service equipped with all improvements.

As a matter of fact electric elevator door openers have been worked out which run admirably and in every way as well as the pneumatic door openers, but the cost of installation is at present so much in favor of the pneumatic device that the electric has found little use. In the electric door operating device the work is done by a double solenoid of peculiar shape. This is placed at the top of the door. One of the two solenoid coils which operate on the same core acts to open the door and the other to close it. The rack and pinion and air cylinder at the left of the solenoid comprise a pneumatic cushioning device. The switch controlling the solenoid coils is on top. When the operator on the car wishes to open the door he presses a foot button, just as with the air system, and a mechanical device on the car trips the solenoid switch instead of tripping the air valve, as on the pneumatic opener. The solenoid then promptly draws the door open. When the elevator man releases the button or when the car leaves a floor the switch is tripped the other way, the left hand coil of the solenoid is brought into play and the door is drawn shut. Just as the door is closed the switch controlling the left hand solenoid coil is automatically opened, so that there is no consumption of energy when the device is not in use.—*The Electrical Engineer.*

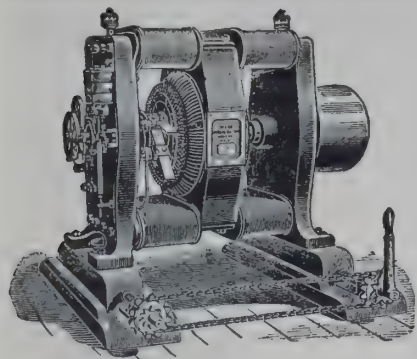
### Electric Smelting.

[From the *London Electrical Review.*]

IT appears that the Americans are likely to lead us once more in the matter of electric smelting. Europe generally does the research work, but America is usually the first to adapt the discoveries which are made to the practical business of life. At Niagara some improved furnaces are now being laid down. These are large cast-iron drums, and resemble in appearance the spool upon which cables are wound. On the two outside peripheries iron plates can be clamped, and these serve to keep in the ores which are to be reduced. The drum is mounted on a shaft and can be slowly rotated by suitable gear. The electrodes are carbons fixed side by side, their points touching an imaginary line drawn horizontally through the axis of the furnace. The heat due to the resistance of the ore is, of course, developed between these two points, and, as the ore is reduced, the resultant metal lowers the resistance of the furnace, and the amperemeter rises. When this occurs the furnace is slowly rotated, and by this movement the metal is drawn down away from the electrodes and fresh ore is also brought between them to be acted upon in like manner. The reduced ore cools within the furnace, and can be extracted cold at the other side of the drum after moving the clamped plates. The adjustment of the furnace is to be automatic, a small motor controlled by an ammeter rotating the drum and keeping the current constant. This furnace is the outcome of elaborate experiments, and, judging from the results which the author of the paper describes, we should expect great things from it.

**Some Hundred-Ton Locomotives.**—Two mammoth locomotives, which will weigh over 215,000 pounds and in size and traction capacity outdo anything now in operation, are being built for the Union Railway Company, (Carnegie), of Pittsburg, by the Pittsburg Locomotive Works. It is expected that they will haul over 7,700 tons each.





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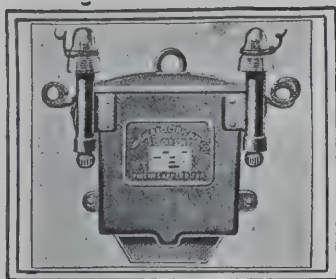
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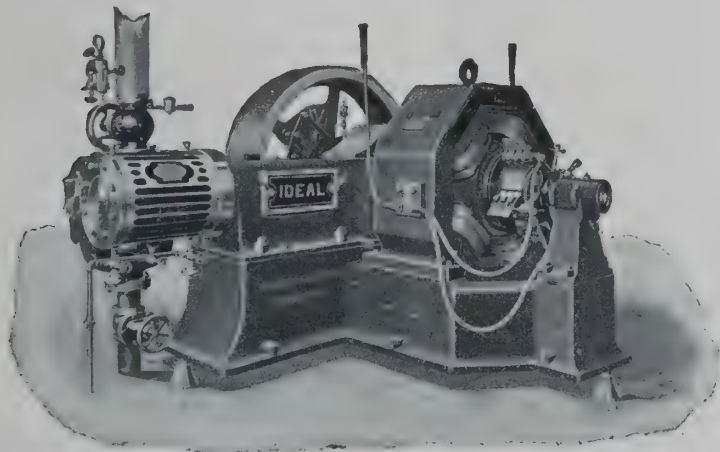
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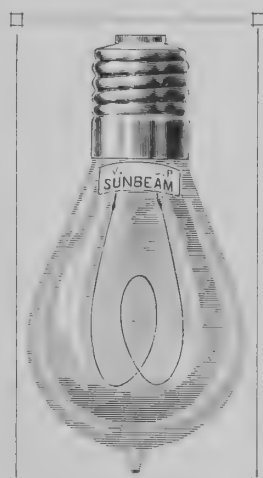
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MARSEILLES MANUFACTURING COMPANY, Marseilles, Ill., U. S. A., 1898-99 catalogue of a great variety of corn shellers, feed grinders, horse-powers, feed cutters, wood saws, windmills, etc. The corn shellers which are a specialty of this firm, are made in every possible size and adapted to all kinds of power. We note an interesting statement in this catalogue regarding the loss farmers incur who market their corn in the ear. In 1,000 bushels the loss amounts to fifty-eight bushel of shelled corn, besides the expense of hauling and freighting six tons of cobs which are given away instead of being burned for fuel.

CHICAGO HOUSE WRECKING COMPANY, West 35th and Iron streets, Chicago, Ill., U. S. A., have sent us one of the most interesting catalogues we have ever seen. This firm dismantles buildings of all kinds, and, among others, dismantled the World's Fair Buildings at Chicago, paying \$80,000 for structures that it cost \$33,000,000 to erect. In addition to selling the materials obtained from this source it purchases at sheriffs', receivers', assignees', manufacturers' and trustees' sales. This catalogue describes merchandise purchased in this way and offered at greatly reduced rates. Nearly every kind of article manufactured is included in the list from builders' materials to housefurnishings, crockery to steam engines.

WESTERN TELEPHONE CONSTRUCTION COMPANY, 250-254 South Clinton street, Chicago, Ill., U. S. A. Nearly half of this 135-page handsomely illustrated catalogue is devoted to descriptions of the switchboards and switchboard improvements made by this firm. These are in every variety of size and type and present many important recent improvements and inventions. The catalogue further describes all other articles incident to a complete telephone installation, such as lightning arresters, distributing and test boards, power generators, telephone receivers, transmitters, etc., in every style, police, fire alarm and railway patrol boxes and similar supplies.

THE MUNSON TYPEWRITER COMPANY, 94 Wendell street, Chicago, Ill., U. S. A., have just issued a new and very finely-illustrated catalogue announcement that will doubtless prove full of interest to the trade.

### The Largest Dynamo in the World.

THE rapid development of electric power for various purposes has made a demand for larger and larger units in the generating stations where this power is produced. A few years ago generators of 100 to 200 kilowatts capacity were considered enormous machines. There soon appeared, however, direct-driven generators of 750 kilowatts, to be used in large railway plants in such cities as Chicago, Boston, St. Louis and Brooklyn. At the World's Fair, in 1893, the first 1,500-kilowatt generator made its appearance in the Intramural Railway Station. This machine was then considered a monster. This unit was soon adopted for many of the large street railway stations, notably in Chicago and Boston, and finally machines of 1,600 kilowatts were placed in the Kent Avenue Station in Brooklyn. Still later, Louisville, Ky., purchased a 2,200-kilowatt generator. The Metropolitan Street Railway Company, of New York, has recently placed an order for a number of 2,500-kilowatt alternating machines, and but a few months ago the Boston Elevated Railway Company, which succeeded the West End Street Railway Company of that city, gave an order for a 3,000-kilowatt machine.

All of these large machines are made to run at the very slow speed of from 75 to 80 revolutions per minute. It is true that the alternating-current machines built for the Cataract Construction Company at Niagara Falls have an output of 5,000 horse-power each, while the monster ordered by the Boston Elevated Railway Company has an output of but 4,000 horse-power. Nevertheless the 4,000-horse-power machine is much larger than the alternators in use in the Niagara Falls power-house, as the speed of the Boston machine is 75 revolutions per minute, while that of the Niagara machines is somewhere in the neighborhood of 300 revolutions per minute. If the Boston machine were run at the high speed of the Niagara machines, its output would be something over three times that of the latter, or about 16,000

horse-power. As the construction of this 4,000-horse-power generator marks an era in the development of dynamo-electric machines, it may be interesting to electrical engineers and those using electrical apparatus to know its dimensions and general design. The total weight of the complete machine is 250,000 pounds. The frame is made of cast steel and is circular in form, the diameter over all being 21 feet 7 inches. The weight of the frame alone, without the field magnet cores for magnet spools, is 50,000 pounds, or 25 tons. To the inside of the magnetic ring or frame are bolted 24 laminated steel magnet cores or pole-pieces, the total weight of which is 30,000 pounds, or 15 tons. The inside diameter of the bore of these pole-pieces, completed, is 15 feet 6 inches. The magnet cores are each provided with magnet spools, wound with shunt and series coils, in the usual way. The pole-pieces are arranged to hold the magnet spools in place, and each core is bolted by four 3-inch bolts to the inner surface of the magnet frame. The magnet frame is divided in halves, on a horizontal plane, and is mounted upon the foundation plates in such a manner that the whole frame may be made to slide lengthwise of the engine shaft, far enough to uncover the armature windings or to allow the individual magnet cores or field spools to be removed without separating the magnet frame.

The armature spider of this machine is an interesting part of its construction. It is made in halves, like the hub of a flywheel, to be bolted together upon the shaft of the engine after it reaches its destination. If it had been made in one piece, no railway car could be found large enough to ship it from Cleveland to Boston. The armature hub weighs, complete, 40,000 pounds, or 20 tons, and has an outside diameter, before the laminations are in place, of 13 feet. After the engine is upon its foundation, in Boston, this armature spider will be mounted upon the engine shaft, which is itself 37 inches in diameter. The laminations, which form the armature core, the total weight of which is 30,000 pounds, or 15 tons, will then be built upon the periphery of the armature spider. The slotting in the armature laminations will register accurately and provide, when completed, 594 slots. The insulation and windings will then be fitted into the slots and connected with the commutator. The commutator itself is made up of 1,188 bars, and is 105 inches in diameter. It is divided into halves for the purpose of shipment and ease of handling, and will be placed upon an extension of the armature hub after the latter is secured to the engine shaft. The great flywheel of the engine will be bolted directly to the armature hub near its periphery, in order that the regulating force of the wheel shall not be transmitted wholly through the shaft of the engine. This will relieve the armature shaft and its keys from the enormous strain to which they would otherwise be subjected.

The machine has been most carefully designed and an unusually large factor of safety provided for every part subjected to mechanical or electrical strain. Because of this the machine will be able to take twice its normal load for short periods of time without injury, and to carry a 50 per cent. overload for several hours. The greatest care has been taken to secure from the generator a higher percentage of efficiency than has thus far been attained in units of large size. There seems to be no limit to the capacity to which these large generators can be carried. The development that has taken place thus far is an interesting study in view of what must ultimately come when we are compelled to provide means for the transmission of power for those large schemes of propulsion which are awaiting the application of electricity in place of steam. What will be the limit to the size of machines required when our main line steam railways are operated by electricity?—*The Electrical Review.*

### Lighting Cars by Electricity Generated from Friction.

THE Santa Fé Railroad Company has made arrangements to light all the cars of their limited trains running between Chicago and Los Angeles, a distance of 2,209 miles, with electricity generated from the friction of the car axles. The electric equipment of each train will aggregate 4,928 candle power. All berths will be provided with berth lights, and this will be the first train in the world generating such a large supply of light service exclusively from the car axles. It is the intention also to light the locomotive headlight from the same service, thus making the four limited trains solid axle-light trains throughout. The introduction of this system on the limited trains will mark quite a departure from previous practice, which necessitated a large light plant in the baggage car. The objection to this plan is that if the baggage car meets with an accident or the plant is out of order the entire light output of the train is deranged. In the axle-light system such a thing cannot happen. Each car has its own plant, which is small but compact and complete, consisting of a dynamo and storage batteries.



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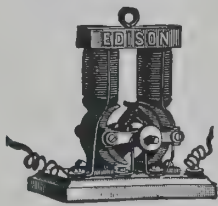
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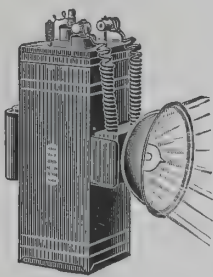
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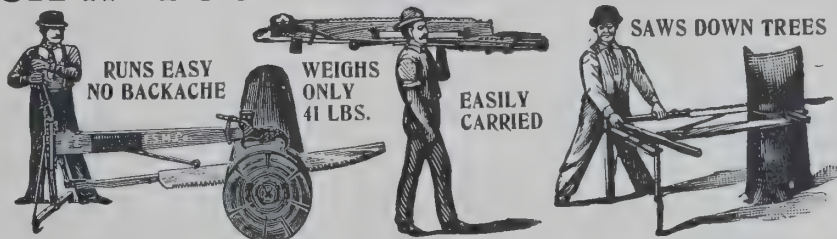
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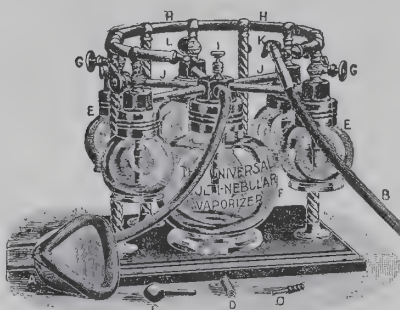
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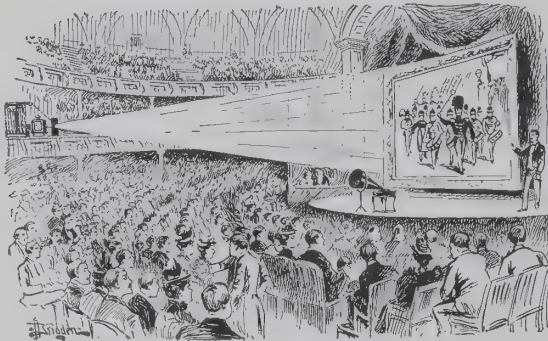
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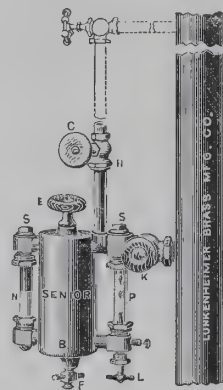
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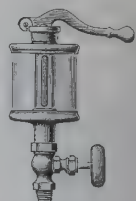
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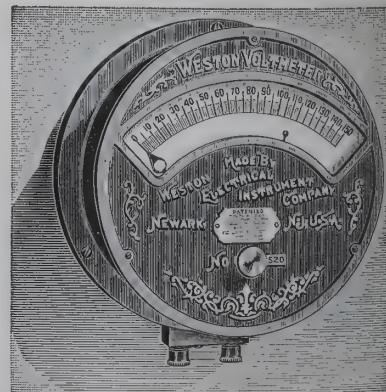
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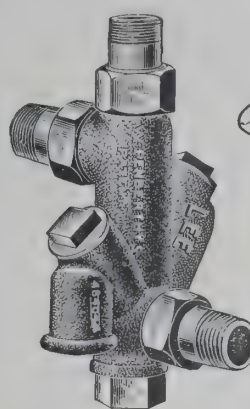
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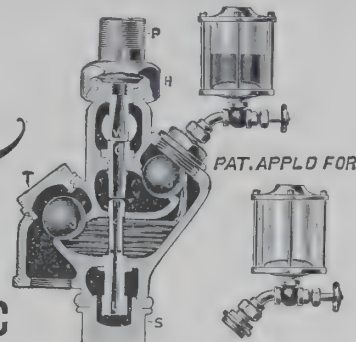


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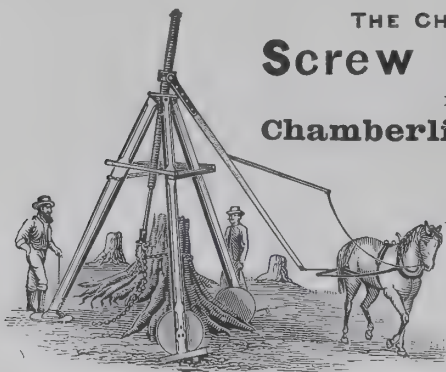
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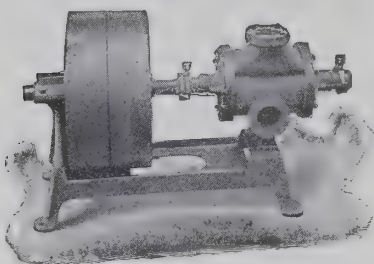
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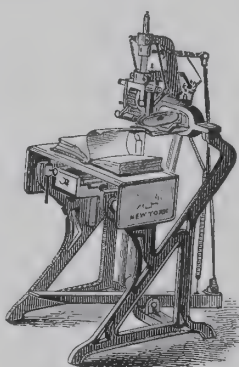
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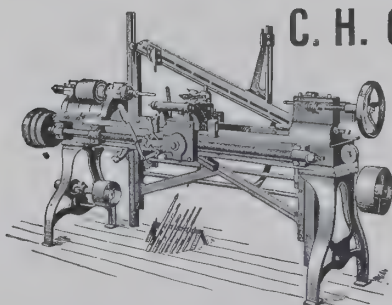


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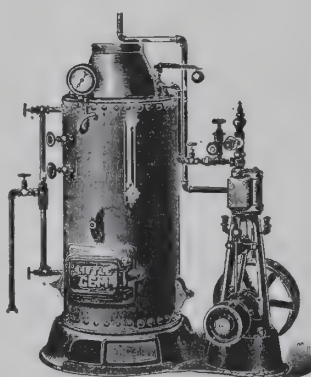
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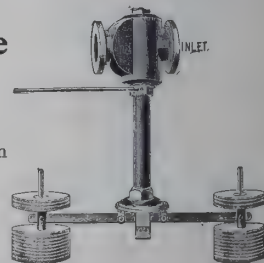
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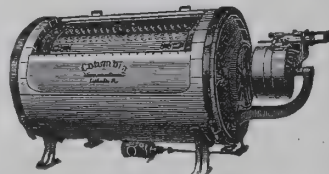
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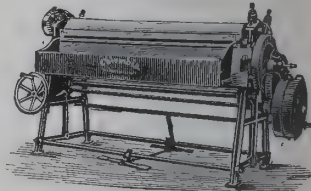
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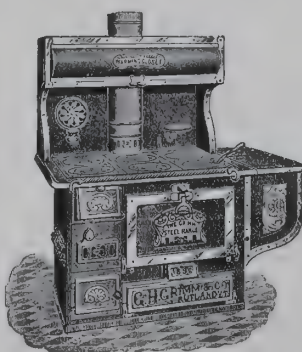
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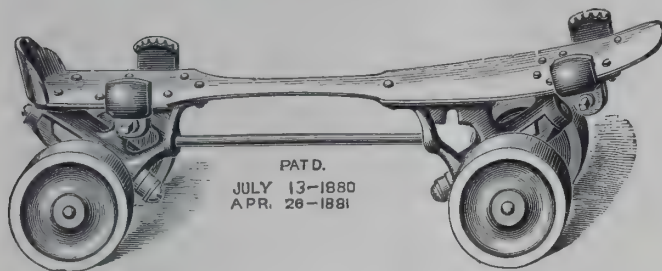
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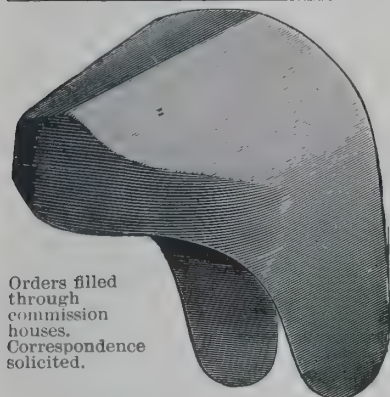
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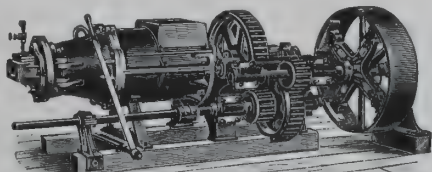
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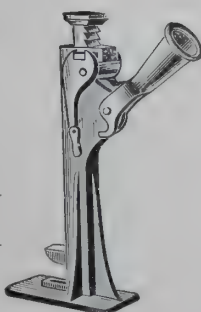


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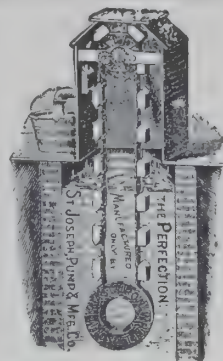
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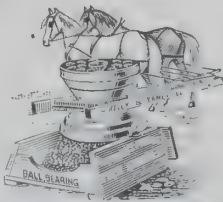
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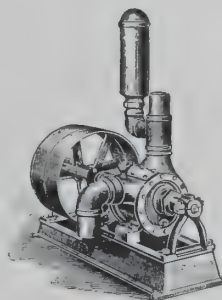
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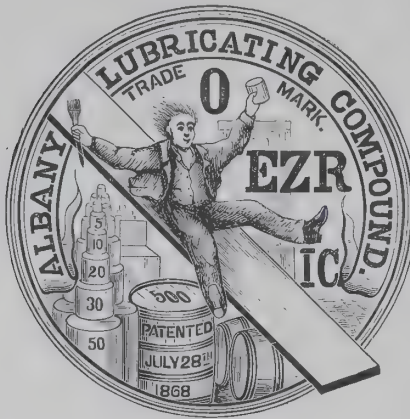
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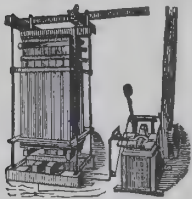
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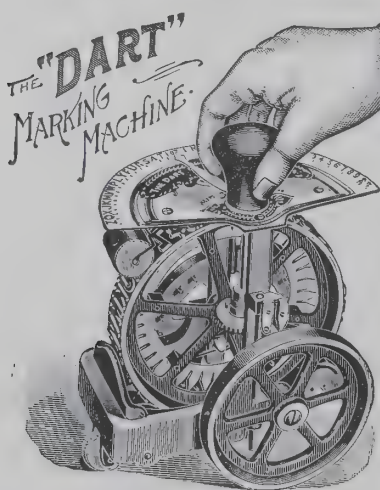
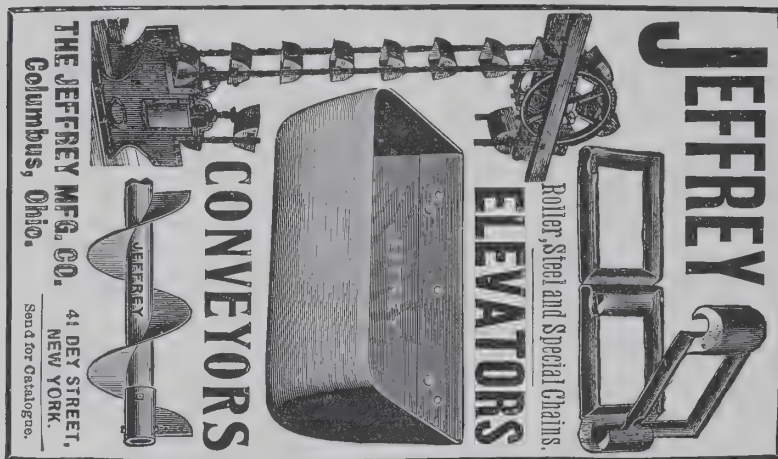
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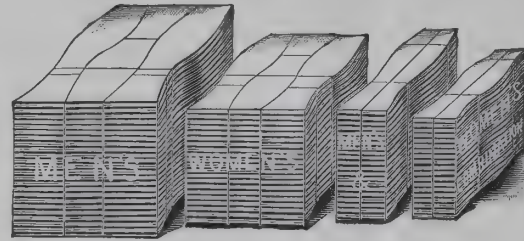
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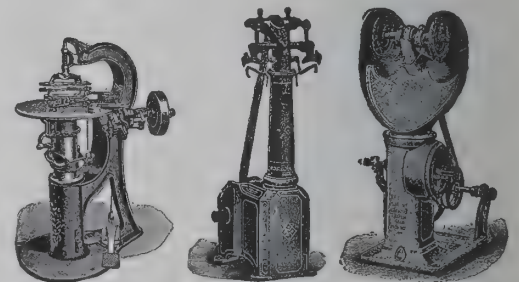
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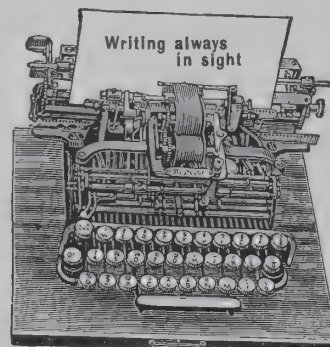
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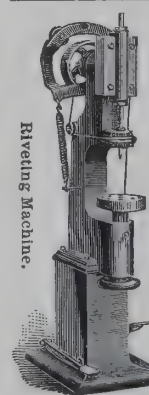


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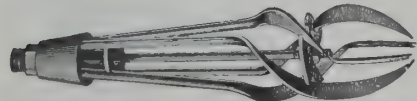
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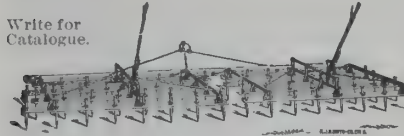
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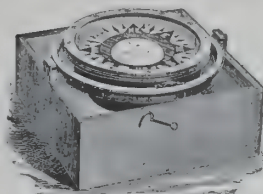
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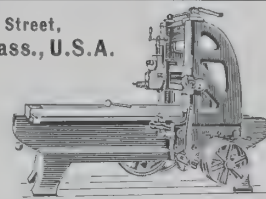
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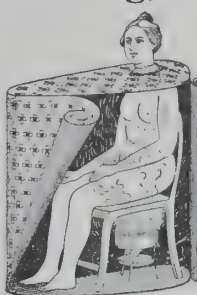
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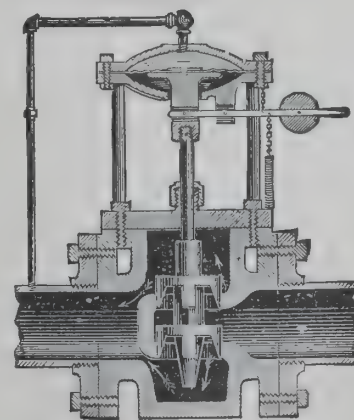
Cures Colds, Rheumatism, Gout, Neuralgia, La Grippe, Female Complaints, All Blood, Skin, Nerve and Kidney Diseases. Reduces Surplus Flesh, Beautifies the Complexion.

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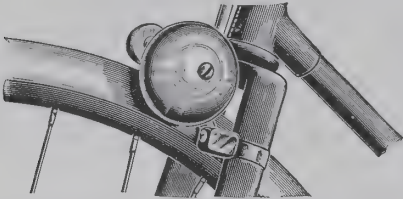
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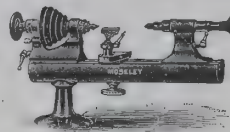
The cut represents the Ericson Automatic Bicycle Bell attached to the front fork of the machine by a clamp bracket and operated by a friction pulley thrown in contact with the tire of the front wheel, and connected by a small lever on the left handle-bar which can be pressed by the fore-finger without moving the hand out of position. We claim this bell is simple, durable and effective, does not rattle, is easily adjusted and will give a short or continuous ring, as desired. All the parts are nickel-plated and highly finished. Made in two sizes— $\frac{3}{4}$  and 3 inches. Correspondence solicited. Orders filled through commission houses.

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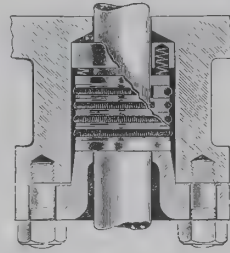
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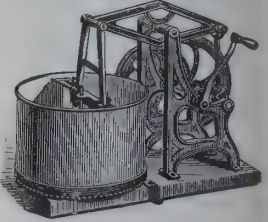
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Affords delightful amusement for old and young.

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Send for Illustrated Circular, Prices, etc., to the Manufacturers.

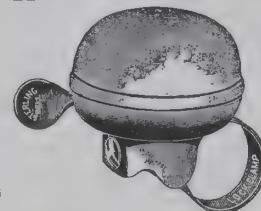
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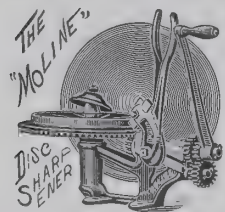
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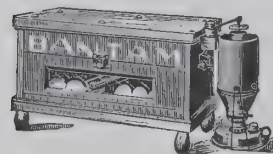
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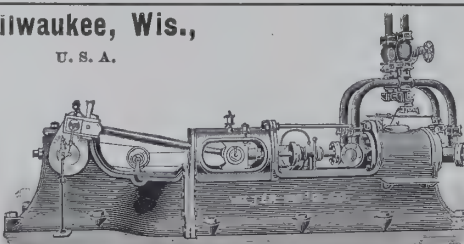
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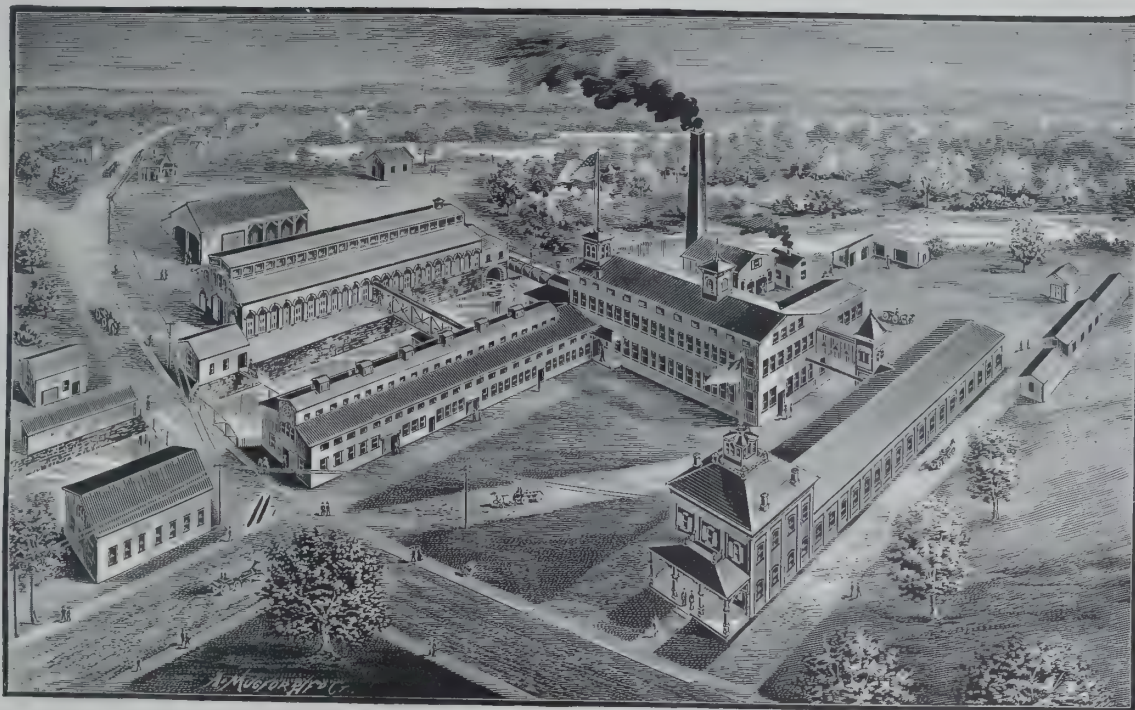


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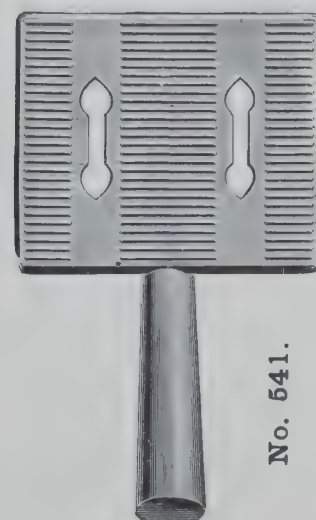
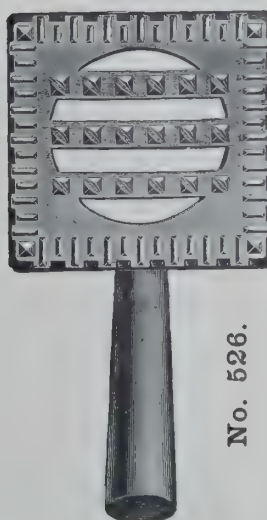
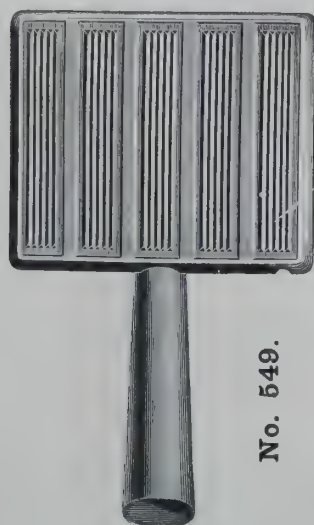
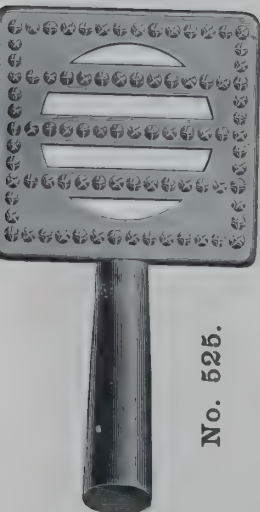
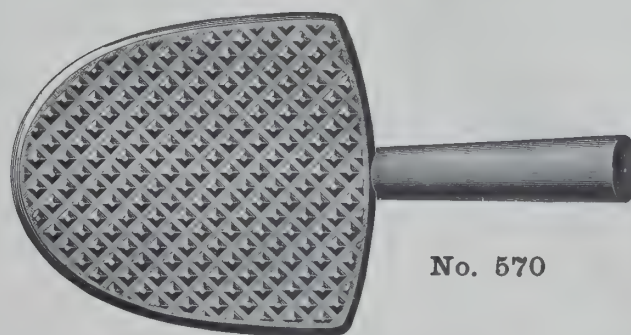
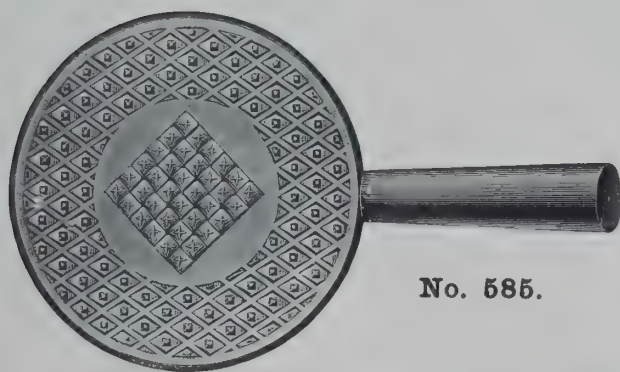
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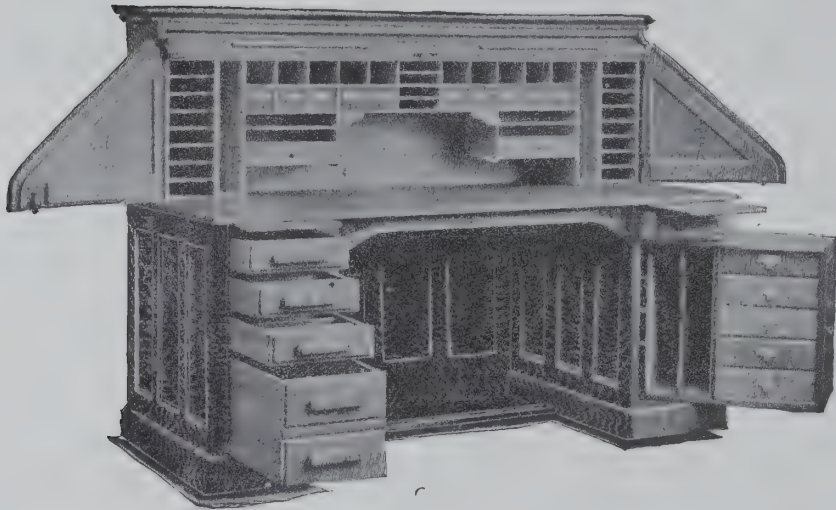


# DESKS!

# DESKS!!

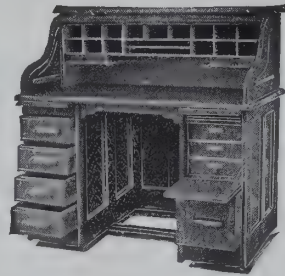
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NO. P. 301, "A."

**\$45.00** buys this desk exactly as illustrated. It is 66 inches long, 33 inches wide, 51 inches high. It is made of the finest selected quarter sawed white oak, and has swinging side arms and FIVE COMPLETE LETTER FILES. 66 inches long, style "A," \$45.00. Style "B" or "C," \$41.00. 72 inches long, style "A," \$49.00. Style "B" or "C," \$45.00.



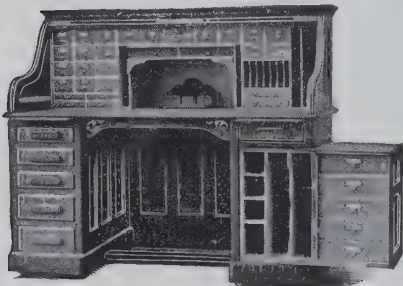
NO. P. 10 E.

**\$19.75** buys this desk exactly as illustrated. It is 48 inches long, 30 inches wide, 51 inches high. It has quarter-sawed oak front, closed back and THREE LETTER FILES in right pedestal under lock and key. This desk has been A GREAT SELLER.



NO. P. 243, STYLE "B."

**\$17.00** buys this desk exactly as illustrated. It is made of quarter-sawed white oak and is supplied with LETTER FILES and large drawer in right pedestal. Size, 36 inches long, 28 inches wide, 44 inches high.



NO. P. 212, STYLE "A."

**\$43.50** buys this desk exactly as illustrated. It is 60 inches long, 33 inches wide, 52 inches high. It is an extra fine desk, made of quarter-sawed white oak and has FIVE COMPLETE LETTER FILES in the right swing pedestal.

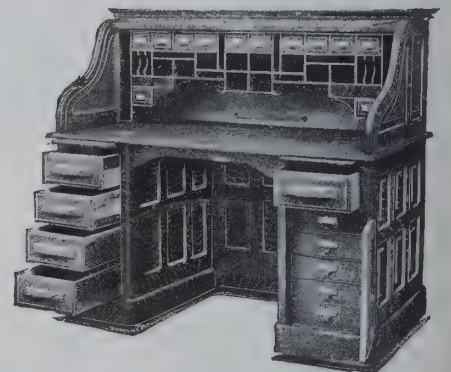
60 inches long, style "A," \$43.50.  
Style "B" or "C," \$40.00

**NOTE.**—Style "A" has drawers in left pedestal and letter files in right pedestal as illustrated. Every person must have some place for letters, invoices, receipts, etc. Style "A" provides complete LETTER FILES within arm's reach, dust proof and under lock and key—a very desirable feature. Style "B" has drawers in both right and left pedestals. Style "C" has drawers in left pedestal and book cupboard in right pedestal.



NO. P. 216, "C."

**\$11.60** buys this desk exactly as illustrated. It is 50 inches long, 30 inches wide, 31 inches high. It has closed back and is made of selected oak. Style "B" or "C," \$11.60.



NO. P. 241, STYLE "A."

**\$35.00** buys this desk exactly as illustrated. It is 58 inches long, 32 inches wide, 51 inches high. It is made of the best figured quarter-sawed oak or cherry, and has FIVE COMPLETE LETTER FILES in right pedestal.

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ALL PRICES given above include cost of boxing and delivery to New York City ready for export.

ALL DESKS are made of the best quality of white oak and are supplied in either light, medium or dark finish to suit purchaser, medium being supplied unless otherwise requested. All our desks are finished with best quality of piano polish finish.

ORDERS: We are well known to the leading export merchants of New York City, any of whom will be pleased to execute orders for our goods.

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Makers of Office and Library Furniture.

Grand Rapids, Mich., U. S. A.

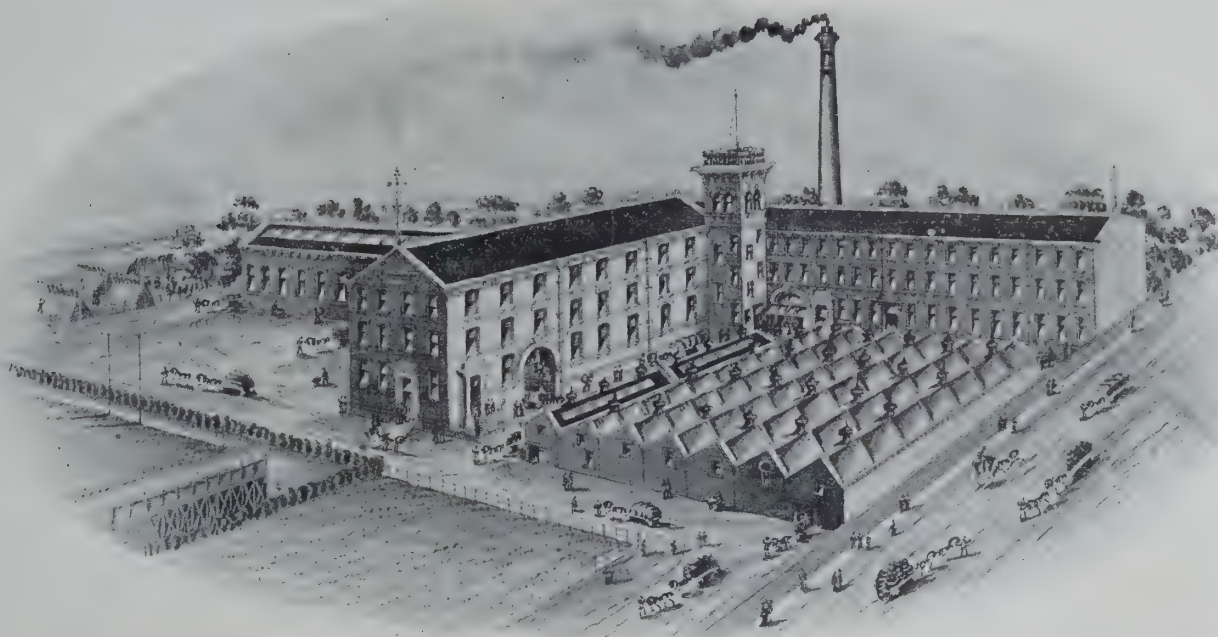


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BOSTON, MASS., U. S. A.

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Wholesale Manufacturers and Exporters of the following STANDARD BRANDS  
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for ladies' and misses' shoes, is far superior to all others, as it blacks, polishes, softens and preserves the leather. Bottles hold about DOUBLE the usual quantity. Price per gross, \$16.00; discount 10 per cent.

## "SUPERB" PATENT Leather Polishing Paste.

The only article that will produce a quick, brilliant and waterproof lustre without injury to the leather. The professional bootblacks of the United States use far more of this article than all other makes combined, because it



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package contains a 2-oz. bottle of russet leather cleaner and a small decorated tin box of russet leather polishing paste. The cleaner removes the dirt and stains, and the paste adds a brilliant, durable and waterproof polish. Price per gross, \$8.00; discount 10 per cent.

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For giving russet and yellow colored shoes a brilliant, durable and waterproof polish. Try it once and you will never be satisfied with any other polish. Per gross, large size decorated tin boxes, \$8.50; discount 10 per cent. Small size, \$5.00 per gross; discount 10 per cent.



**FRENCH GLOSS.** Warranted fully equal to the best \$9.00 black dressings in the market (and put up handsomer). With handsome three-color lithographed cartons and wood caps over corks. Price per gross, \$8.00; discount 10 per cent.

Also Manufacturers of POLISHES for Chocolate, Ox-Blood, Green, Brown, Blue and Purple Russia Calf, Vici Kid, "Willow" Calf, etc. "ELITE" Combination for Box-Calf, Black Vici Kid, etc.; also Dyes for converting light shades of leather into any of the above-mentioned colors.

All first-class articles that suit every one. If you are not suited and want the best, send us a trial order. Orders can be sent through any commission house in New York or Boston. Send for illustrated price list.

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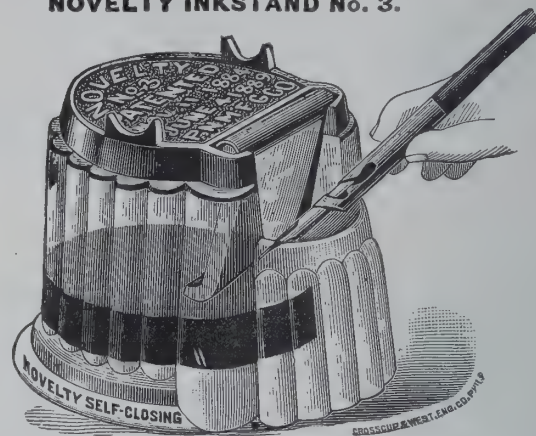
# PHILADELPHIA NOVELTY M'F'G CO.

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## NOVELTY INKSTAND No. 3.

Novelty (Self-closing) Inkstand No. 3,

(SMALL),  
Retail,  
35 cents.



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75 cents.

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All our goods, numbering more than 50 different articles, are patented, controlled and manufactured exclusively by ourselves, and are sold all over the world, about one-half of our business being for export. They are all standard novelties in every sense of the word, and have been awarded numerous premiums at the universal expositions of Sydney, Melbourne, Adelaide, Barcelona and Paris, for novelty, workmanship, finish, simplicity, utility and cheapness.

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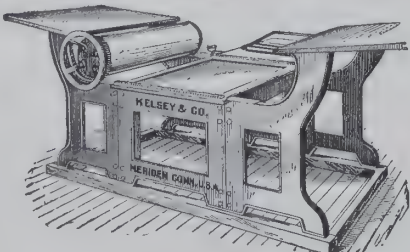
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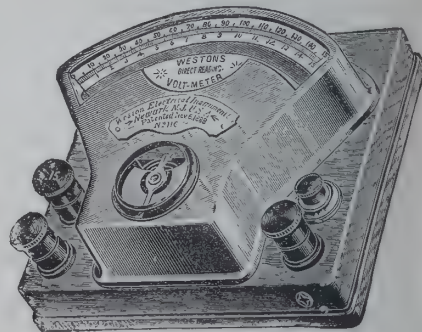
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Ground Detectors and  
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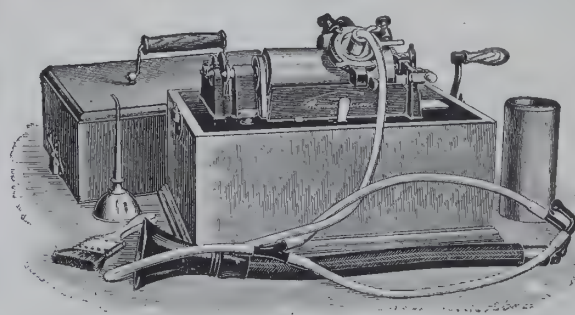
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Records reproduces, shaves off cylinders, has sapphire points. Runs 3 records with one winding of spring.

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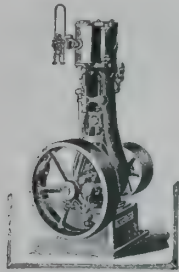
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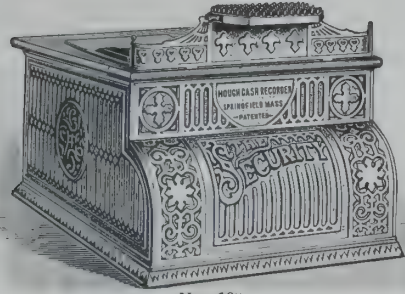
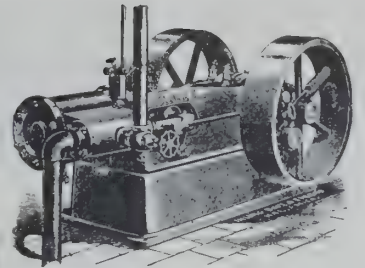
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16  
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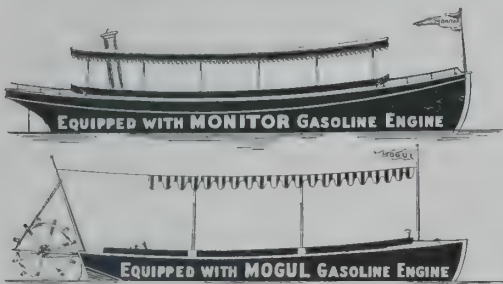
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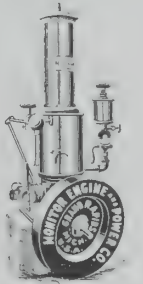
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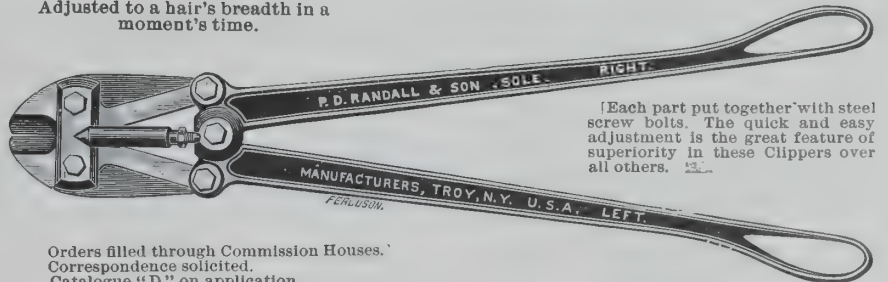


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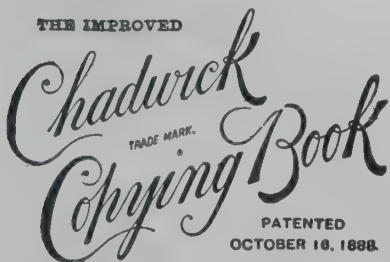
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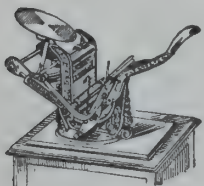
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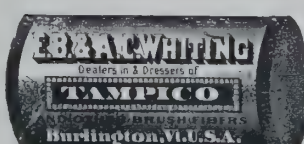
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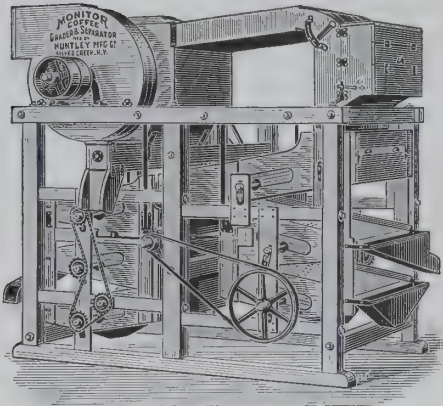
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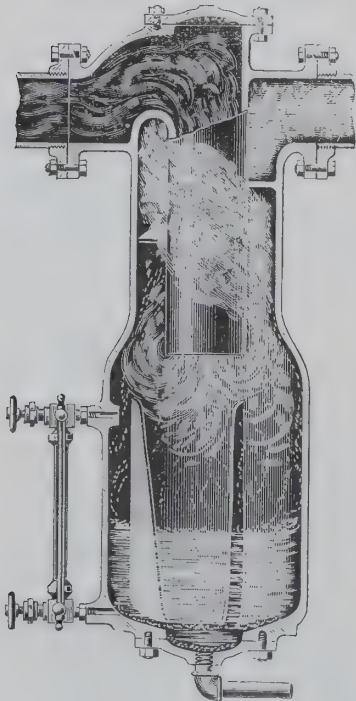
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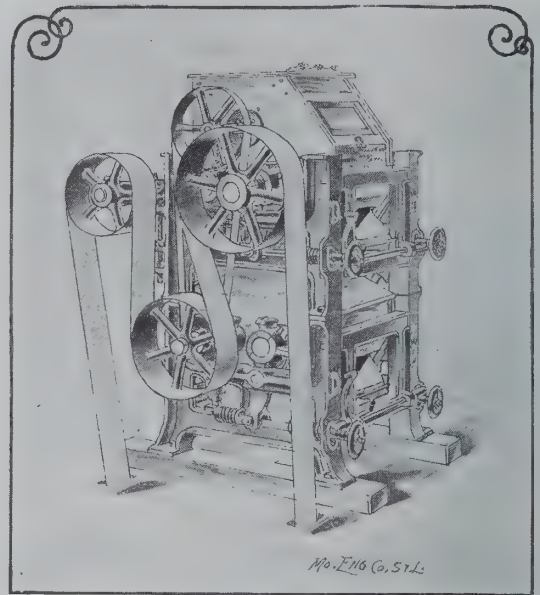
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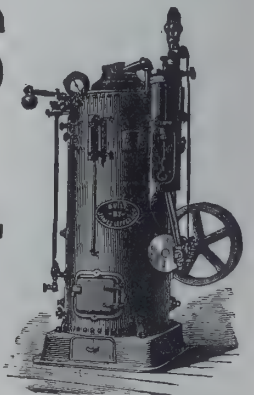
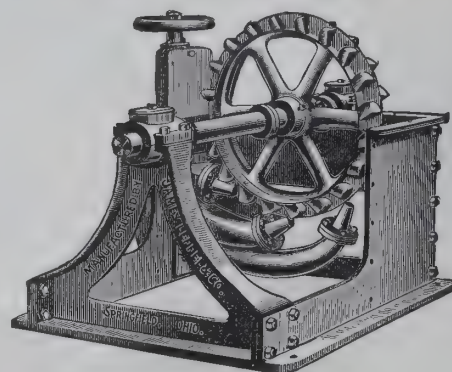
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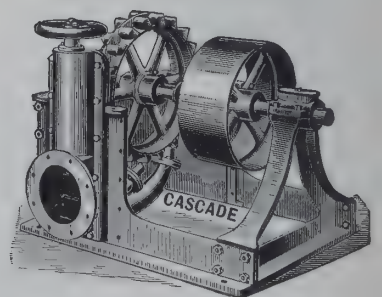
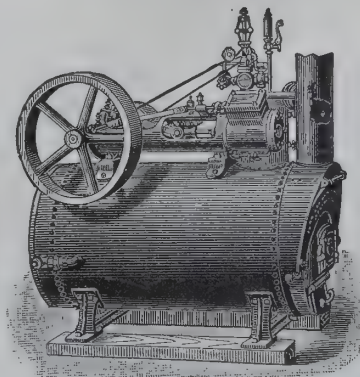
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THE AMERICAN EXPORTER does not publish reading notices recommending goods of any special make. To do this for one manufacturer and not for another producing wares equally meritorious would be manifestly unfair. We therefore recommend our readers to carefully examine its advertising pages, which are filled with the announcements of many of the best manufacturing concerns in their respective lines. What our advertisers say therein affords highly interesting, instructive and profitable reading, especially for merchants and importers who desire to obtain all that is latest and best in the line of manufactured goods.

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Inquiries concerning goods advertised in this paper should be addressed direct to the advertisers themselves, or, if readers prefer to order through their American buying agents, the name of the manufacturer of the desired article should be carefully specified. As a rule, orders should not be sent direct but to experienced and reliable export commission merchants for execution.

We shall be pleased to send to foreign buyers not having buying agents in New York the names and addresses of reputable concerns best qualified to serve them, provided that they state the nature of their business and the class of goods they are most likely to require.

### UNIVERSAL PEACE.

ON August 27th the *Official Messenger*, of St. Petersburg, published the now famous appeal of the Czar in behalf of a universal disarmament. Some of the more notable passages from this document, which the London *Chronicle* regards as the most striking of the century, and the London *Telegraph* as perhaps the most important in the history of the world, follow:

"The maintenance of general peace and the possible reduction of the excessive armaments which weigh upon all nations present themselves in the existing condition of the whole world as an ideal toward which the endeavors of all governments should be directed.

"In the course of the last twenty years the longings for general appeasement have grown especially pronounced in the consciences of the civilized nations. The preservation of peace has been put forward as the object of international policy. It is in its name that the great States have concluded between themselves powerful alliances. It is the better to guarantee peace that they have developed in proportions hitherto unprecedented their military forces, and still continue to increase them without shrinking from any sacrifice.

"Financial changes, following an upward march, strike at public property and at the very source of intellectual and physical strength. Nations' labor and capital are for the major part diverted from their natural application and unproductively consumed. Hundreds of millions are devoted to acquiring terrible engines of destruction, which, though to-day regarded as the last word of science, are destined to-morrow to lose all value in consequence of some fresh discovery in the same field. National culture, economic progress and the production of wealth are either paralyzed or checked in development.

"It appears evident, then, that if this state of things is prolonged, it will inevitably lead to the very cataclysm which it is desired to avert, and the horrors of which make every thinking being shudder in advance.

"To put an end to these incessant armaments and to seek a means of warding off the calamities that are threatening the whole world is a supreme duty which to-day is imposed on all states.

"Filled with this idea his Majesty has been pleased to order that I pro-

pose to all the governments whose representatives are accredited to the Imperial Court the meeting of a conference which would have to occupy itself with this grave problem. This conference would be, by the help of God, a happy presage of the century which is about to open. It would converge in one powerful focus the efforts of all the states which are sincerely seeking to make the great conception of universal peace triumph over the elements of trouble and discord. It would at the same time cement an agreement by a corporate consecration of the principles of equity and right, on which rest the security of states and the welfare of the peoples."

The student of history will need to go back very far to find a parallel to this document. Indeed in many respects it is without a parallel. The lofty ideal of the Czar suggests in many particulars the "Truce of God" that was proclaimed by the Church of Rome during the earlier years of the century that saw William of Normandy conquer England. Human progress was then being crushed under the feudal anarchy that had prevailed for centuries, just as to-day, in the eloquent language of the Czar, it is paralyzed or checked in its development by the militarism of Europe. The idea of a perpetual peace, under the favor and protection of the Church proved hopeless, but where the "Peace of God" failed the "Truce" from Wednesday night to Monday morning and on holy days succeeded, at least partially, in restraining the warring and lawless passions of the time.

Whether the proposal of the Russian Emperor will lead to a similar compromise the historian of the future must record, but certainly it is a notable presage of peace that such a suggestion should be so much as made, and made seriously, at this time. The problems to be solved by such a conference as that proposed would be many and complex, but we believe that they could all be solved. The world has long since outgrown the stage of civilization when fisticuffs could be regarded as anything but a ridiculous method of settling a personal difference. It is fifteen hundred years since any one has believed that the fact that A is the harder or the more skillful hitter proves that he had the right in his dispute with B. Yet "Trial by Battle" still remains the final arbiter between states.

If the Czar succeeds in effecting even a partial and provisional disarmament it will be one of the greatest triumphs in history, not only for Nicholas II., but for Russia and the world. But meantime, while the ambassadors are talking, business men will not fail to note that the subject of their discussions is not the long-threatened universal war, but universal peace. The outlook for international trade can only grow brighter as such conferences progress.

### CONSOLIDATION AND SPECIALIZATION.

ONE of the most important and far reaching tendencies of the times in the industrial world of the United States is that resulting in the consolidation of formerly competing interests. The movement in this direction is not of recent origin. At the outset most industrial enterprises in this country were conducted on a small scale. Tiny shops were started at convenient points along mountain streams, whole towns devoting themselves to a single industry much as was the case in Europe. The successful employees became in time employers themselves, and it was no uncommon thing for a family of brothers to be engaged in the same industry, yet each operating a small plant of his own and competing with the others.

This condition of affairs held true of transportation interests as well as manufactures. Independent railways ran from town to town, and to go from New York to Chicago, for example, it was necessary to pass over more than a score of lines. This not only resulted in a great deal of unnecessary confusion and complication, but involved a great deal of needless



expense as well. The cost of shipping wheat and other products of the Central West to the Atlantic seaboard was almost prohibitory. Combination effectively solved the transportation problem in this country. Powerful and scientifically managed corporations now control railway systems aggregating thousands of miles, with the result that both passenger and freight (goods) traffic is now handled at rates that would have seemed incredible twenty years ago.

The application of this process to manufacturing enterprises was obviously more difficult and was possible at all only in the cases of commodities for which there was the widest possible demand. The past decade has witnessed, however, several highly successful applications of the theory of consolidation to industrial enterprises, with the result in every instance that the cost to the consumer of the article manufactured has been reduced while its quality has been improved.

The reasons why this should be so are obvious on a moment's reflection. Consolidation effects economies along a dozen lines. Instead of a dozen different salesmen running after every possible order and spending, collectively, in salary, railroad fares and hotel bills nearly the full amount of the order itself, only one would be sent to represent all the consolidated interests. Office expenses and managerial expenses could be reduced in the same way. In the works themselves another important series of savings might be made. The buyers for the consolidated firms could, of course, secure lower rates than would be possible to any of them separately. Plants less advantageously situated could be abandoned and sold and their machinery distributed among the others. The manufacture of competing machines—if the consolidated plant be a machine manufactory—could be discontinued and the work redistributed so that products could be grouped according to their nature or the exigencies of their manufacture, thus enabling workmen to become especially skilled in the making or fitting of certain parts and admitting of the use of labor-saving machinery to a greater extent.

A similar series of advantages would be possessed by such a consolidated plant in the matter of furnishing improved models to its patrons. Duplicate products could be discarded, and where the output of one mill embodied one valuable feature and that of another a different one these special features could be combined in the product of the consolidated works and any bad ones dropped, with the result that the user would be greatly benefited.

To the foreign buyer these advantages should appeal with especial force. He is, in effect, reaping where he has not sown, for the fierce competition over here in America that has brought about these consolidations has been without expense to him while he is thus permitted to enjoy its beneficent results in the fullest manner imaginable.

Another tendency in American industrial enterprise has manifested itself almost coincidentally with the one that we have been discussing, although, if anything, it has been of still earlier origin. This is the tendency toward specialization. As industrial enterprises developed it was found that better work could be done when a group of men devoted all of their energies to the perfection of specific portions of a given product rather than spread their attention over all the numerous processes necessary to its completion.

The result of this is that to-day instead of the rule being that every manufacturer of bicycles—to take one instance out of many as an example—engages in every process and perfects every part in his own works, the reverse is the case. There are huge plants devoted to the manufacture of bicycle tubing; others engage in making sprockets, cranks and hangers; still others make a specialty of chains. Rims are a

specialty, as are tires. Large and well-known firms offer handle bars, not to the general public or dealers so much as to the manufacturers. Saddles, tool-bags, lamps and the numerous other "accessories" are all made by firms devoting all of their talents and capital to perfecting these special lines.

The same is true, though perhaps not always to such a striking degree, of many other lines of manufacture. The manufacturer whose name the finished product bears is, of course, solely responsible to the buyer for the guarantee. Every part has been made to conform to his specifications and to meet his tests.

But the general fact of this specialization is not only of interest but of importance to the foreign buyer. So far as we are aware it prevails in no other country in the world to anything like the extent to which it prevails in America. In itself it is a guarantee of concentrated attention to specific details that insures satisfaction.

The words at the head of this article may have seemed to some an oddly grouped pair. The one denotes apparently the antithesis of the other. How, then, can *both* be tendencies of American industries? Are our industrial enterprises both drawing together and flying apart at the same time? To these very natural queries the answer is simply that both thus far are acting side by side. In general, consolidation appears to be the rule now with enterprises engaged in producing commodities of a staple nature and of universal demand, while specialization appears to prevail, as would be expected, in those lines where the demand depends largely upon the merit of the product as regards either ingenuity or finish.

Foreign buyers will do well to take account of both these tendencies of the American market in placing their orders. Obviously both offer advantages to the consumer, the importance of which cannot easily be overestimated.

### THE EXCHANGE OF IDEAS.

IN this age of steel and steam and electricity progress, to be really valuable, must be rapid. It is not enough merely to keep up with the procession. We must forge ahead, advance more rapidly than our fellows, if we would achieve the highest measure of success.

It is not possible to do this without first informing ourselves almost minutely as to what our associates and competitors are doing, or, when this is impossible, at least keeping thoroughly abreast of the general progress of the age in those subjects that pertain to our business. No nation has a monopoly of this indispensable spirit of progress. The United States cheerfully confesses its indebtedness to Europe for a thousand ideas that have contributed most materially to the happiness and advancement of its people. Indeed, the very Constitution under which we live embodies in itself the experience of a score of nations and represents the political teachings of more than thirty centuries.

It is quite lately, however, that business men have felt that they, too, must study and investigate and compare to the end that the foundations of their business success might be as broad and firm as possible. For years, both in Germany and in this country, those responsible for the great educational institutions of their country have devoted immense amounts of time and money to comparing methods and discussing theories, to studying the conditions under which they were working and attempting to solve the various educational problems that confronted them. Business men are now coming more and more to do the same thing.

Not only do the heads of firms in many important lines meet now more often than ever before and discuss the general



problems connected with their branch of industry, but they are encouraging similar action on the part of their foremen and employees. We could mention a number of great manufacturing concerns that have established reading-rooms and libraries for their men, and have succeeded in inducing them to gather together frequently to discuss matters pertaining to their work. All this is thoroughly in harmony with the spirit of the age to which we have just alluded, and is an encouraging sign of the times.

We believe that it would pay large firms employing many hundreds of men even to go to the expense of sending some of their brightest foremen and heads of departments to foreign countries to study the methods and conditions prevailing there. It would be particularly valuable to have these men sent to the works where much of the machinery it is their business to use was made, and talk with the men who designed and constructed it. It is entirely possible that a single idea so met with might, if put into practice intelligently on the traveller's return, save his employers the cost of his trip, while it is probable that a great number of suggestions of practical utility would be brought back.

### AMERICAN IRON AND STEEL.

ONE of the most phenomenal features of the altogether remarkable industrial history of the past few years, on both sides of the Atlantic, is the rapid rise of the United States as a producer of iron and steel. In 1870 the total pig-iron production of the world was not far from 12,000,000 tons, of which Great Britain furnished 50 per cent., the United States 14, Germany 12, France 10 and Sweden 2½. By 1896 the total production had increased to 30,000,000 tons, to which England and the United States each contributed 29 per cent., Germany 21½, France nearly 8 and Sweden 1½.

These totals regarding pig-iron production present only one phase of the situation. A companion picture is presented in the statistics of the exports and imports of this country in iron and steel products. In 1880 these imports amounted to \$71,266,699 and the exports to \$14,716,524. Ten years later the imports had fallen to \$41,697,501, while the exports had risen to \$25,542,208. Three years later our exports exceeded our imports, and from that time to the present the balance in our favor has steadily increased, as shown by the following table:

	Imports.	Exports.
1894.....	\$20,925,769	\$29,220,264
1895.....	23,048,515	32,000,989
1896.....	25,338,103	41,160,877
1897.....	16,094,557	57,497,872
1898.....	12,615,913	70,367,527

Expressed in words these figures mean that in 1880 the United States imported five times as much of iron and steel products as it exported. To-day we export five and a half times as much as we import. The figures have been more than reversed in eighteen years.

From the point of view of the American market this result clearly indicates that, as we have more than once pointed out, American manufactures are now able, and increasingly more than able, to supply the great domestic demand that first stimulated their enterprise into activity. From the point of view of the buyer in the wider world market it means, can only mean, that the widely varied products of American iron and steel that are finding their way across both the Atlantic and the Pacific are giving satisfaction as regards both quality and price.

Not long ago the explanation offered by the English

technical journals for the steadily increasing exports of American iron and steel to Great Britain was that these trans-Atlantic contracts were taken below cost, either for the sake of the advertising they were supposed to effect, or in order to keep the works running full time, the manufacturer depending upon his domestic orders for profits. The London *Engineer*, which certainly cannot be accused of excessive friendliness to American methods or enterprise, definitely rejects this explanation as untenable. It says:

"Now and again we hear of steel and iron being sent from America to the Old World, but the explanation usually given is that this is simply 'bounce,' or by way of advertisement on the part of the United States manufacturers. 'It does this country no good,' said a leading Sheffield manufacturer, 'to ignore the truth in this way. At this moment the American is sending over in the regular way of business heavy consignments of steel. True, these are mainly in the cheaper grades, but the time will come when they will be sent over in the costlier qualities.' He mentioned that a single firm in London is now receiving United States steel at the rate of nearly 250 tons per annum. American steel, he added, is also being sent into Birmingham in very large quantities. It is mainly used for bicycle work. In bright-drawn steel for bicycle purposes, for nuts, screws and bolts, or anything that can be made in large quantities by means of automatic machinery, the American steel is preferred, not merely by the manufacturer who finds it lower in price, but generally by the workman, as its uniform temper enables him to work it smoothly right through with considerably less wear on the tools. That the influx of steel from America is not mere bounce or advertisement is evident by the concern shown by some of our manufacturers. At the last meeting of the Ebbw Vale Steel, Iron and Coal Company, Limited, Wales, one of the directors stated that there would be anxiety for some time to come in connection with the steel works, owing to the new appliances and the improved methods in America and on the Continent, as well as the keenness of competition. Another director—who is also a director of a large steel concern in Sheffield—attributed the serious period of depression which had fallen upon the Ebbw Vale Steel Works to the flow of steel from America into this country.

"Some time ago a Sheffield manufacturer asked us to look at several large consignments of American-made files he had just received. Several of these were in the finer and smaller sizes, which are only produced in this country at prices very much higher than they can be delivered in England from the States. Undoubtedly the American file is lighter than the British, and the objection to it on this side is that it cannot bear recutting; but, as this manufacturer explained to me, files can be made at such low prices nowadays that few people trouble themselves about recutting at all. As for prices, Sheffield manufacturers charge considerably higher than the Americans in most of the sizes, and many of the workers on brass, iron and steel prefer the American. The foreign files are said to be particularly favored in the great districts where the textile trades are carried on, and the quantities now being received in London and Birmingham, the principal distributing centres, are far greater than even the trade supposes.

"Another item may be mentioned—the smaller sizes of malleable iron castings. American firms are at this moment delivering these castings in Sheffield at fully 30 per cent. below local prices. Here, again, it is but right to admit that the railway rates materially assist the foreigner. It will not do to say, however, of these castings that they are simply sent over by way of advertisement or that they are not of good quality. The very opposite is the case. They come over in the regular way of business—a business which is steadily increasing—and they come over of such quality that the workmen themselves are openly heard to confess their preference for the American production. In one of the establishments where they are used in very large quantities, we asked various workmen as we passed from place to place which he preferred—the American or the British casting. The invariable reply we got was that the American casting was preferred because it was truer and more uniform in quality. The users, too, mention another difficulty. That difficulty is to get adequate deliveries of these small malleable castings where large quantities are required. The head of one house told us that he had often been disappointed in not getting his order completely filled, and in the end has had to send a cablegram to American manufacturers, who have sent him all he wanted in a much shorter time than he could have got them within a few miles of his own door. It is impossible for any one who is much in the habit of visiting the large industrial establishments of this country to avoid seeing how rapidly American labor-saving machines are being utilized. Specific instances are constantly coming to our notice of this; instances where British manufacturers, who have been fighting all their lives against using American machines, have latterly, through failure to get what they wanted in England, been compelled to adopt foreign-made lathes and other special machines, and now they say they would not be without them.

"The business of supplying these American inventions to British industries is only just beginning. It is not to the interest of British manufacturers to admit this much, but they are gradually being forced to the conclusion that there is no denying the advance of the American, both in his methods of production, his application of those methods in the use of the



machinery by which they are applied, and the men by whom they are worked."

Nothing that we can say would add to the conclusiveness of this evidence as to the reasons for the great increase in the exports of American iron and steel that we have noted above. Business men the world over are increasingly averse to mixing business and sentiment together. The universal quest is for the cheapest and the best, whether that combination is to be found at the door or 3,000 miles away.

### THE BALANCE OF TRADE.

SOME of the acutest minds have puzzled both themselves and others by highly theoretical discussions regarding the balance of trade and the advantages, economic, social and other, that were supposed to flow from its possession or be sacrificed should it be lost. We must confess that for our part we have never been able to feel that practical business men need bother themselves any more about the balance of trade than about the balance of power in Europe or the weight of the moon. It is one of those things that settle themselves, and no individual by taking thought is likely to greatly affect the balances of international trade one way or another. Governments to be sure might do so, but then only by interfering with the natural course of trade in a manner that would be more productive of harm than good.

At the same time it may not be altogether profitless to devote a few moments to considering the significance of what is, on the whole, one of the most remarkable changes that the students of international trade balances have ever had to chronicle. Fifty years ago the United States imported merchandise of all descriptions to the amount of \$148,638,644 and exported altogether, including foreign merchandise exported, \$138,190,515. The balance of trade for that year, 1848, accordingly stood against this country to the amount of \$10,448,129. During the decade following, this balance increased, in spite of occasional fluctuations, rising in one year, 1854, as high as \$60,760,030. The year 1858 saw a momentary reversal of this condition. Both imports and exports had nearly doubled during the ten years, and when the accounts for 1858 were made up it was found that the balance was for the first time in favor of this country to the amount of \$8,672,620. Then for fifteen years the balances remained against this country, with the single exception of 1862, when, owing to our Civil War, both imports and exports fell off heavily and the balance happened to be slightly in our favor. In five of these fifteen years the balance against the United States exceeded \$100,000,000, and one year it reached the considerable sum of \$182,417,491.

Only two years after this, however, the balance began to turn decidedly in the opposite direction. In 1874 our imports amounted to \$567,406,342 and the exports to \$586,283,040, making a balance in the favor of the United States of \$18,876,698. The following year this showing was almost exactly reversed, but from that time to the present the balance has, with three exceptions, 1888, 1889, and 1893, remained steadily and increasingly in favor of this country. On twelve occasions this balance has exceeded \$100,000,000, and on seven it has passed the \$250,000,000 mark. It remained for the fiscal year just closed—ending June 30, 1898—to surpass all records and roll up the imposing trade balance in favor of the United States of \$615,259,025.

We cannot at present dwell upon the significance of this very striking reversal of the trade balance as regards the United States and the rest of the world combined further than to point out that as a whole it indicates in the most convinc-

ing manner imaginable the expansion that has taken place in the manufacturing industries of this country. The decline of imports means that domestic manufacturers have succeeded in producing numberless articles formerly imported from abroad. Really, however, imports have not declined to such an extent as these figures would seem to indicate, their falling off being relative rather than specific. As business improves in America we look to see an increase in our imports. But it does not now seem likely that the balance of trade will soon return to the side of the account that it occupied for so many years when our manufacturing industries were struggling for a foothold in the home market. They are strong now, many of them are giants, and their advent into the world markets comes at a time when the world most needs their strength.

### PROSPERITY AMONG THE MANUFACTURERS.

THE close of the vacation season and the resumption of business this Fall find American manufacturers in a stronger position than ever before to cope with their increasing export trade. One of the best evidences of the soundness of our manufacturing industries is found by noting the number of failures of manufacturers for August and comparing it with the returns for the same month two years ago.

Two years ago there were 298 failures among manufacturers in August. Last month there were only 145, or less than half as many. The following table, taken from the figures furnished by *Dun's Review*, gives a fair idea of the magnitude of the improvement that has taken place:

Manufacturers.	Liabilities	
	1898	1896.
Iron, foundries and nails.....	\$2,600	\$599,000
Machinery and tools .....	195,100	374,300
Woollens, carpets and knit goods.....	89,500	163,000
Cottons, lace and hosiery.....	12,200	119,600
Lumber, carpenters and coopers.....	105,136	3,787,220
Clothing and millinery.....	80,755	113,200
Hats, gloves and furs.....	700	22,000
Chemicals, drugs and paints .....	47,300	49,108
Printing and engraving.....	20,695	41,945
Milling and bakers.....	71,200	653,833
Leather, shoes and harness.....	176,500	602,029
Liquors and tobacco .....	88,300	226,950
Glass, earthenware and brick.....	152,600	189,600
All other .....	838,647	6,158,464
Total manufacturing .....	\$1,881,233	\$13,100,249

It is well known that prosperity, like failure, is contagious. One industry after another feels the reviving influence of the good times, and each, in turn, gives a stimulus to others. There is every indication that this Winter will be one of the busiest and most prosperous in the history of American manufactures. That there will be no diminution in the volume of our foreign trade is already assured.

### A GOOD BEGINNING.

“WHAT’S well begun is half done” is an adage that contains a great deal of truth, whether taken literally or in spirit. Certainly, the importance of choosing the right name in enterprises in which the names employed are significant is most serious. And in no branch of business is this preliminary a matter of greater moment than in the case of ships. A ship well named is often accounted a lucky one among the half-superstitious sailors, and in any event the name quickly becomes as much a part of the vessel’s entity as the name of a man is of his.

Whether the owners of the fine fleet of steamships that are to be used in the fruit trade between the United States and Jamaica considered these points when selecting the name for the first, which was launched at an American shipyard



a short time ago, or whether the name was the happy inspiration of the moment we do not know. But certainly no more auspicious name could have been chosen than the *Admiral Dewey*.

Not only in recognition of the achievements of an American who "conquered an empire without the loss of a man," but in recognition of a sterling type of American manhood and intelligence that gives to the world the best possible guarantee that the great opportunities recently thrown before this country will be so acted upon as to conduce to the benefit of all, is this choice a happy one.

We believe that this ship is but the first, not of a single fleet, but of a multitude of fleets that will be built by American intelligence and skill, and will carry the products of American fields and mines and mills to every corner of the globe, and bring the countless products of a thousand lands back again. Most heartily, then, do we wish "Godspeed" both to the *Admiral Dewey* and to the ships that are to follow carrying the same flag.

ONE of the most interesting questions that suggest themselves as one wanders along the docks of a great city like New York and looks at the myriads of ships with their towering masts or sturdy smokestacks, and notes the swarms of humanity hurrying over and around them stowing away merchandise of a thousand kinds is "Where do all these things go?" Statistics sometimes help us to answer such a question. Another query is, "How does this trade compare with former years—are we gaining or falling back?" Here again there is some relief in figures, dry though they proverbially are. Ten years ago we sold to nations classed as African \$3,000,000 worth of goods; now our sales to the same nations amount to \$17,000,000. In the same time our sales to Japan have increased from \$4,000,000 to \$21,000,000; our sales to China, from \$4,500,000 to \$10,000,000. The increase of sales to Austria-Hungary have increased from \$500,000 in 1888 to \$5,000,000 in 1898; increase to Belgium, from \$10,000,000 to \$47,000,000; to Netherlands, from \$16,000,000 to \$65,000,000; to France, from \$40,000,000 to \$100,000,000; to Germany, from \$56,000,000 to \$150,000,000; to British North America, from \$38,000,000 to \$85,000,000; to the United Kingdom, from \$362,000,000 to \$540,000,000. These are but a few instances selected almost at random, but they show the direction of the tide. They show also that the goods represented by the smaller figures of ten years ago and their successors during the intervening years must have given satisfaction, else why the imposing totals of to-day? People do not continue to buy in increasing quantities unless they are getting good value for their money.

THE result of the recent bidding on the twenty-eight torpedo boats called for by the American Government, under the Naval Appropriation Act of 1898, is a striking evidence of the rapidity with which a new industry can be established in this country, and acquire sufficient expertness to turn out products capable of meeting successfully the severest possible tests. Ten years ago it was considered fortunate that we had one firm in the United States capable of turning out a torpedo boat of 22 knots guaranteed. Even this firm at the last moment felt compelled to ask permission to use an English boiler, which the naval officials granted.

Now, we find at least fifteen firms scattered through eleven different States, from the Atlantic to the Pacific, and even this list lacks the name of some well-known shipbuilders, while it includes several who have never before built ships for the Government. It is worth noting, also, that the firms

now bidding are offering to build 26-knot, 29-knot and 30-knot boats, and to do their work in many instances in greatly less time than has ever before been attempted in this country. The entire equipment in every case, moreover, is to be American. Altogether, this indicates in the most conclusive manner possible that a new industry has arisen in this country, and has already not only gained a considerable degree of confidence in itself, but the capacity and experience to justify it.

IT appears that the products of American farms and packing factories are not the only imports into Germany that are the prey of the vigilant Agrarians of that country. The Prussian Minister of Agriculture has issued orders that hereafter no poultry shall be driven over the German frontier, and that whatever live fowls are imported shall come by rail, packed in such a manner that no hay or straw can fall out of the crates or the cars. The reason given for this stern order is the prevention of the importation of poultry cholera.

Russia, however, looks upon the measure as a mere trick to place difficulties in the way of her flourishing goose trade. The established customs of that trade are disturbed by the Prussian Minister's edict. The Russian Government accordingly protested and the protest being unheeded, a small tariff war has been inaugurated that bids fair to work mischief with the plans and policies of German diplomats.

We are not particularly interested in all this ourselves, except in so far as it furnishes an indication that the agrarian policy of Germany already referred to in these columns is still running along its accustomed enlightened lines. So far as we can foresee there can be but one result of such a policy if consistently carried out and persisted in and that is the gradual destruction of Germany's foreign trade, export as well as import. For the sake not only of international harmony and good-will, but for the sake of fairness and courtesy in the commercial relations of all nations that seek to buy and sell with one another, we trust that this policy will be definitely abandoned, not only in Germany, but wherever it is in favor.

#### A \$200,000,000 Steel Company.

A CERTIFICATE of incorporation was issued September 10th to the Federal Steel Company with a capital fully paid in of \$200,000,000. The company was incorporated under the laws of New Jersey, and the State franchise tax amounted to \$40,000, said to be the largest fee ever paid for incorporation in that State.

The powers as conferred by the articles of incorporation are practically unlimited, and the amount of its capitalization makes the Federal Steel Company one of the largest business organizations in the United States, and for that matter in the world. The new company was organized for the sake of consolidating several large plants, namely: The Illinois Steel Company, the Minnesota Steel Company, the Elgin, Joliet & Eastern Railway, the Lorain Steel Company and the Johnson Steel Company.

The new combination will, by no means, overshadow the field in which it proposes to coöperate entirely; but will have several powerful rivals, chief among these will probably be the Carnegie Steel Company. The Carnegie interests, like those just consolidated, control both mines and transportation lines. The independent concerns which remain outside of these great combinations appear to be in no way dismayed at the prospect of being crushed by overwhelming competition. As a matter of fact many of them are also very strong, and represent aggregations of capital that a few years ago would have been regarded as colossal.

Altogether the outlook for cheaper and yet cheaper steel in America is a reassuring one, and the chances are that the thousands of American industries that place much of their reliance for success upon the fact that they command the cheapest steel in the world will not be disappointed, and that the foreign buyer who patronizes them will get more for his money in the future than ever before.



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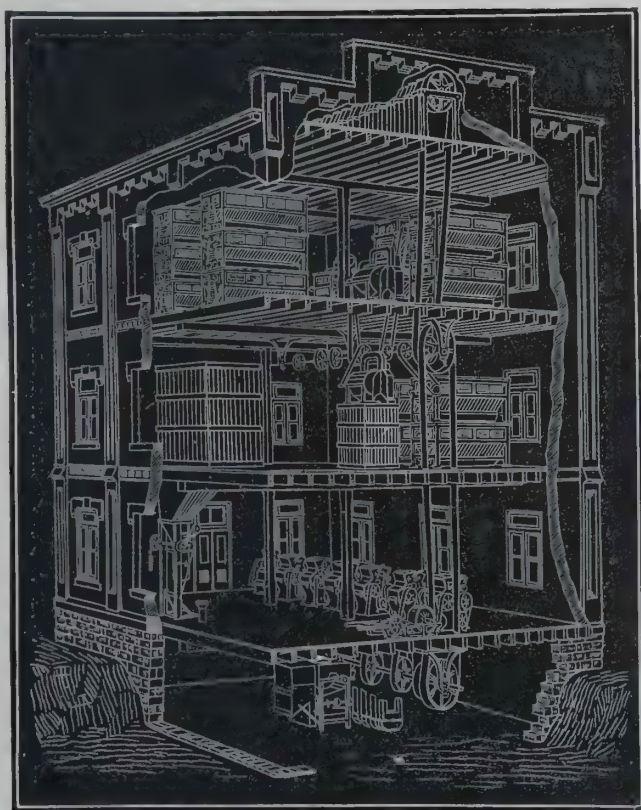
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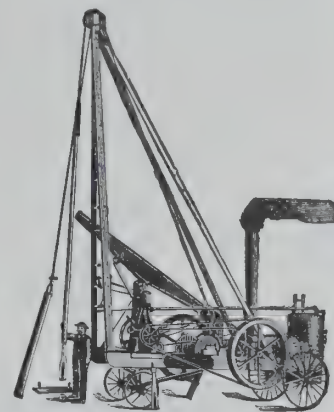
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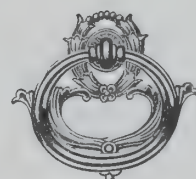
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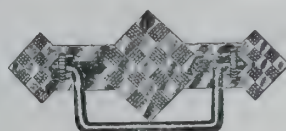
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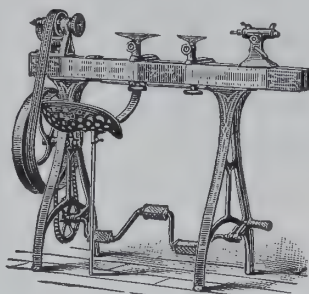
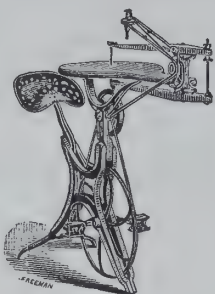
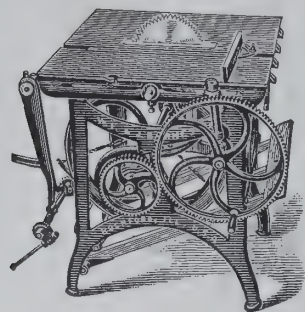


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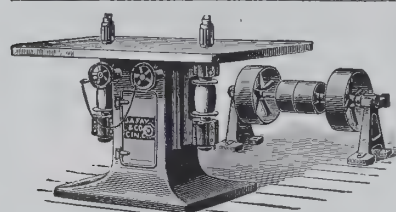
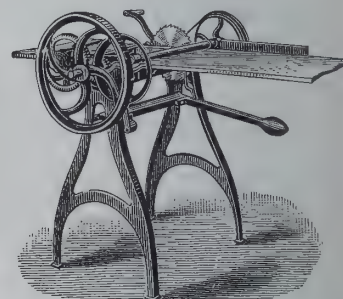
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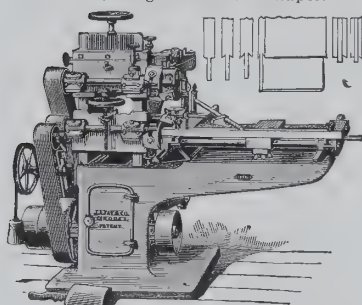
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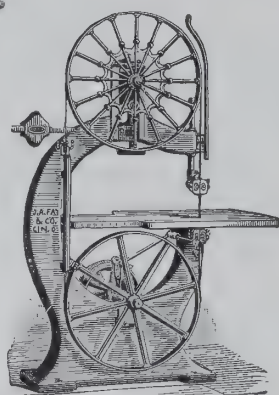
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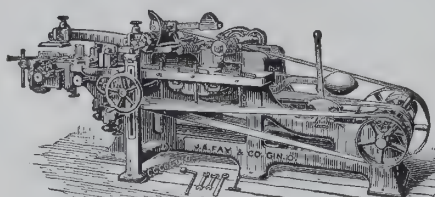
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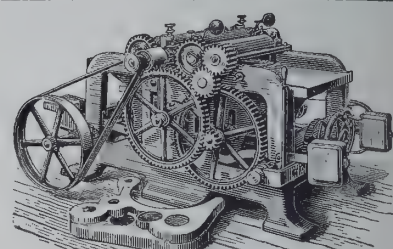
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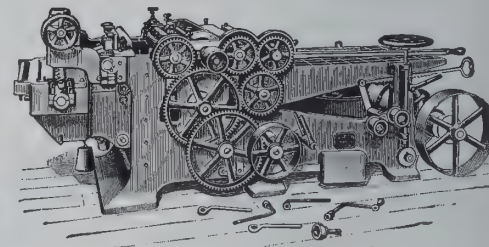
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### Our Export Trade.

THE commercial relations of the United States are undergoing a marked and significant change, which may be said to have proceeded during the past twelve months at an accelerated pace. The United States is no longer the "granary of the world" merely. While its export of agricultural products has increased to a remarkable extent during the past year, its sales abroad of manufactured goods have continued to extend with a facility and promptitude of results which have excited the serious concern of countries that, for generations, had not only controlled their home markets, but had practically monopolized certain lines of trade in other lands. When it is considered that this result has been reached with comparative ease, in spite of added impediments to the United States exports in the form of discriminations of various kinds, and notwithstanding the fact that organized effort to reach foreign markets for our manufactures is as yet in its infancy, the ability of the United States to compete successfully with the most advanced industrial nations in any part of the world, as well as with those nations in their home markets, can no longer be seriously questioned. The reports of consular officers present many striking evidences of the increasing popularity of United States manufactures, especially iron and steel labor-saving machinery and tools, electrical supplies, locomotives, bicycles, etc., and notwithstanding the enormous gain in export of agricultural products, amounting to nearly \$74,000,000 for the eight months ended February 28, 1898, as compared with the same period of the previous fiscal year, the percentage of exports of manufactures, as compared with the total exports, shows a decline of but 1.52 per cent. During the eight months of the fiscal year 1898 there was, in fact, an increase in exports of manufactures amounting to \$6,474,245.

The secret of the steady advance of United States goods in popular appreciation wherever they are introduced is to be found in their superior excellence at little, if any, difference of cost to the consumer. The only thing lacking to enhance their acceptability would seem to be the special adaptation of the styles and patterns to the local requirements of a particular market. Until quite recently it was a common impression in foreign countries, as well as in the United States, that the higher wages paid in the latter would always operate to the disadvantage of our exporters in the competition for the sale of manufactured goods abroad. Actual trial, however, seems to have proved that, owing to the greater producing capacity of the average American operative with the aid of labor-saving machinery, the real cost of United States goods in many lines of manufacture is lower than that of similar products in European countries, and that the American exporter is thus enabled to meet his foreign rival on more nearly equal terms, or even undersell him.

It is frequently asserted of particular industries in the United States that the output of factories working at full capacity is much greater than the domestic market can possibly consume, and it seems to be conceded that every year we shall be confronted with an increasing surplus of manufactured goods for sale in foreign markets if American operatives and artisans are to be kept employed the year round. The enlargement of foreign consumption of the products of our mills and workshops has, therefore, become a serious problem of statesmanship as well as of commerce.—*The American Machinist*.

### Prosperity at Pittsburg.

GOOD times are not expected in Pittsburg. They have already come. To say that every blast furnace is aglow and every chimney pouring forth clouds of smoke is to speak with more than conventional accuracy. It is the general testimony that never before in the history of the city was the volume of business greater than to-day. There may have been spasmodic spurts when the mills and furnaces were rushed harder, but for good, steady employment of the enormous plants now available, no season has ever been better than the present one. The war checked business development somewhat at first, but was not long regarded seriously, and, with the dissipation

of alarm and some Government purchases, trade has become normal again, and is now at a very high tension. Stocks in the hands of manufacturers are smaller to-day than the first of January, although the seven months intervening, according to the secretary of the Sheet Iron Association, have witnessed the largest output of iron and steel of any period of that length on record. Coal men tell the same story. Everybody is busy.

The significance for the nation of a large demand for the peculiar products of Pittsburg cannot be over-estimated. Iron has long been the recognized barometer of trade, and in England, even more than here, forecasters have come to depend upon the activity of the blast furnaces for guidance. Steel is obviously made not for direct consumption, but that, as machinery, railroads, structural frames, etc., it may be used in the production of something else. If any one has any doubt that a period of plenty is setting in with the cessation of the war disturbance, let him come to Pittsburg, and if he wants to get a notion of the tremendous material resources of this country, and the ability of Americans to make use of them, this is, for that reason as well, a good place to visit. No city on the Continent, the assertion might be ventured, offers so wonderful an exhibit of what the ingenuity of man and the lavishness of nature can accomplish.

Within a single ten years the United States has been transformed from a great importer of the kind of articles made here to an enormous exporter, and the latter trade is but in its infancy. What wonders the future has in store for this country cannot be better hinted at than by a survey of Pittsburg's industrial development. If there is any one who thinks the Americans a poor people on a barren shore, take him up one of the inclined railroads to a suburban hill where he can see Pittsburg's acres of flame and smoke, which have been appropriately, if profanely, described as "Hell with the lid off." The city's industries are spectacular. For miles along the railroad coming into the city the blazing coke ovens and blast furnaces and rolling mills let their light shine. The demure and quiet look of the New England factory after the 6 o'clock whistle has blown has no counterpart here. Three shifts of men divide the twenty-four hours of the day between them, as the metal, when the operations have once begun, must not be allowed to get cold. Sunday is the only let-up that the fires along the Monongahela know.

### American Indies Company.

A COMPANY has already been incorporated, with a capital of \$18,000,000, to develop Cuba and Puerto Rico. It is entitled The American Indies Company, and the necessary capital has already been paid in. The company has a general charter authorizing it to build and operate electric plants, telegraph, telephone, steamship and railway lines, to conduct real estate and mining operations and to carry on business in a number of other branches. One of the incorporators recently outlined the purposes of the company as follows:

"The company has been in process of formation for several months, and was organized for the purpose of taking advantage of the extraordinary economic transformation now at work in Cuba and Puerto Rico. It intends to renovate old enterprises and create new ones in those prodigiously rich islands, and to that end it secured the coöperation of some of their most enlightened and conservative citizens, men of wealth and enterprise, who, even under the late restrictive and oppressive régime, have gained distinction as merchants and administrators, and who, representing the new commercial aspirations of those communities, have enlisted both capital and experience in this undertaking. Under the new commercial conditions, industries, especially those concerns operating public franchises, will need readjustment, reorganization and development. This is the work the American Indies Company was organized to accomplish."

**Labor-Saving Appliances in American Shipyards.**—The use of labor-saving appliances in the shipbuilding industry of the United States is among the potential reasons for the rapidity and economy of construction now characteristic of American shipyards. Compressed air is distributed in iron pipes and attachments made with flexible rubber tubes. Tools of many kinds are operated by this power for boring, ramming and chiselling. This means a reduction of the pay-roll and increased efficiency on the part of workers retained on the list. Economies of this kind in such large plants count for a great deal when the competition of the world has to be met. The struggle nowadays is between machines, and the builder or manufacturer having the best will sooner or later head the procession in all industries.



### The United States and the Age of Machinery.

IN the industrial history of the United States there has been no time in which machinery builders have had so broad an opportunity and so many coincident factors of encouragement as at the present time. The country has reached a point of industrial development where its success in war and its potentiality in the arts of peace are among the surprises of older nations.

Aside from all political interest or prestige, it has by mechanical skill distanced its older competitors and become an acknowledged leader in all industrial and labor-saving devices. The use we make of this supremacy depends upon the enterprise and business tact of our manufacturers. The home market is constantly broadening. All kinds of enterprises are multiplying, and the manifest trend of industrialism to economies in production by labor-saving appliances is rapidly centralizing national prosperity on the high efficiency of our machinery. In all kinds of trade the same tendency is apparent, from the maker of shoes to the manufacturer of locomotives, and from the maker of lawn-mowers to the builder of vessels. In fact, we have passed over the transitional stage in this matter.

Machinery is everywhere: in the field, the home, in the workshop, nor is its evolution arrested by its common use. The best machine of a certain type is but the forerunner of a better, and one has but to read the long lists of second-hand machinery for sale to see at a glance the improvements that are rapidly taking place. There is no standing still in this business. The hunger for machinery is upon us, and as the markets of the world open their doors to our production the appetite will continue to be whetted and unappeased. In the world beyond our sea-line the same transitional condition exists. Industrial development is breaking the old crust that for centuries has smothered industry and commerce. In Russia, China, Japan and in Africa industrial enterprise is displacing traditional apathy. In this vivifying process no country escapes its touch. What it may bring about in a political sense and in the transfer of national prestige is one of the problems for the statesman, but what it will do for the machinery builder is beyond peradventure. Our exports of machinery are rapidly increasing without respect to race or flag. For every form of industry we have special appliances. In agriculture, mining, engineering and manufacturing the American machinery builder has made his special mark. In implements of war, as in those of peace, the same brainy ascendancy is observable. This is not underrating the ingenuity or enterprise of some of our competitors who have made and are still making their broad mark on the industrial history of the world.—*Power and Transmission.*

### Some Interesting Facts About American Railways.

The total railway mileage in the United States on June 30, 1897, was 184,428.47 miles, there being an increase of 1,651.84 miles, or 0.90 per cent., during the year. The aggregate length of railway mileage, including all tracks, on June 30, 1897, was 243,444.41, the increase being 3,315.29 miles. The length of second track was 11,018.47 miles; of third track, 995.79 miles; of fourth track, 780.48 miles. The mileage of yard track and sidings amounted to 46,221.20 miles. Excepting yard track and sidings, about 32 per cent. of which is laid with iron rails, substantially 95 per cent. of the railway tracks in the country is laid with steel rails.

The total number of locomotives in service on June 30, 1897, was 35,986. Of these 10,017 were classed as passenger locomotives; 20,398 as freight locomotives, and 5,102 as switching locomotives. The number of locomotives not classified was 469. The total number of cars of all classes reported in service on the date named was 1,297,480. Of the total cars reported 33,626 were assigned to the passenger service; 1,221,730 were assigned to freight service, and 42,124 were assigned to the special service of the railway companies. Of the total cars in service 492,559 on June 30, 1897, were fitted with train brakes, and 668,937 were fitted with automatic couplers, the increase for the year in the former case being 75,237; in the latter, 131,989.

The number of men employed by the railways of the United States on June 30, 1897, as reported, was 823,476. These figures, assigned on the mileage basis, show that 449 men were employed per 100 miles of line. The corresponding figures for the year ending June 30, 1896, were slightly larger. The employees of railways are divided into 18 classes. The number of station agents as reported for the date named was 30,049; other station men, 74,569; engine men, 35,667; firemen, 36,735; conductors, 25,322; other trainmen, 63,673; switchmen, flagmen and watchmen, 43,768, and telegraph operators and dispatchers, 21,452. The aggregate amount of wages and salaries paid was

\$465,601,581. This amount represents 61.87 per cent. of the total operating expenses.

The number of passengers carried during the year ending June 30, 1897, as reported, was 489,445,198. The number of passengers carried 1 mile during the year was 12,256,939,647. The number of passengers carried 1 mile per mile of line—that is, the average indicating the density of passenger traffic during the year ending June 30, 1897—was 66,874. The number of tons of freight carried during the year was 741,705,946. The number of tons of freight carried 1 mile was 95,139,022,225. As in the case of passenger traffic, the density of freight traffic is shown by the number of tons of freight carried 1 mile per mile of line, which was 519,079.

### Why Australians Prefer American Iron and Steel.

THE methods adopted by American manufacturers are noteworthy. A special representative who has been thoroughly instructed in the technicalities of the use of iron and steel under varying conditions has been sent to Australia. He has visited nearly every ironfounder in the principal colonies and is prepared to give detailed information as to the quality of iron of different brands. He undertakes to supply iron of uniform chemical composition, and produces the analysis to the founder and explains the special qualities corresponding to the proportion of various chemical elements present. He inquires as to the special class of work done, the proportion of scrap used, and recommends the trial of certain brands in specified proportions. He is prepared to advise as to the remedies to be applied in case the iron threatens to show defects.

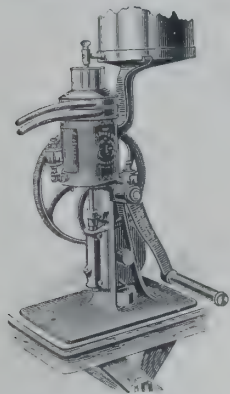
No Scotch or English iron is sold under the same conditions. If a man buys Gartsherrie he has to experiment for himself until he finds the proportion of scrap and the mixtures that suit him. When, in addition to these particular advantages, the American iron is offered at 10s. a ton less than the British, the most patriotic ironfounder feels that he must use it or fail to meet the competition of others who will be less scrupulous. The American iron, we are assured, is sold in Australia at a fair profit, but the American furnaces are producing largely and seek outlets for a portion of the produce. This raises the question whether American iron will always be available at anything like proportionate prices. Should their home market rapidly expand, it might overtake the producing power of the furnaces, and then it would not be worth while to continue to send iron to these colonies. British ironmasters may well consider whether the production of iron is increasing in the States more or less rapidly than the consumption is ever likely to grow. The former is the view held in Australia and by the representatives of the American manufacturers, so that a guarantee is given, so far as it can be given, that the United States furnaces intend to establish themselves in these markets and never relinquish them. The United States market was formerly over-supplied with scrap (the improvement in business having changed this), and the furnaces have naturally had to produce pig iron that will carry a very large quantity of scrap. The Australian market is not so favorably situated in this respect. In Melbourne, good scrap commands 70s. to 72s. 6d. at the present time, and occasionally the market is quite bare. British ships bring considerable quantities, but there is always the risk that, although there is not actual rubbish among it, there may be scraps of spiegeleisen or mottled iron, which entirely upset the equilibrium of the furnaces, so that founders who pride themselves on the quality of their work are tempted to avoid English scrap whenever possible. We understand that supplies of American scrap are likely to be placed on the market ere long, which is another curious development of the competition.

As the Americans have started to consider so closely the requirements of the consumer, British manufacturers must be prepared to do as much or allow themselves to be beaten in the race. At the present time when business is so brisk in the United Kingdom and manufacturers are overwhelmed with orders, such a small consideration as the control of the Australian pig iron market (perhaps 50,000 tons yearly) may seem beneath notice. That is the way in which large businesses are undermined. A competitor here and there starts nibbling away at the foundation on which the business has been raised, and, unless extreme vigilance is maintained, the business collapses, to the surprise of all around, almost before danger is suspected.—*The Australasian Ironmonger*

**New Steamship Line to Hawaii.**—The Seattle-Honolulu Steamship Line, to run between the points named, has been organized in the former city, with a capital stock of \$100,000. The company is out of debt, and has started its first loaded ship to the Hawaiian Islands.



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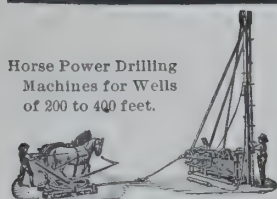
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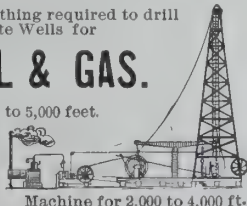
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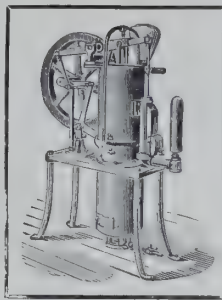
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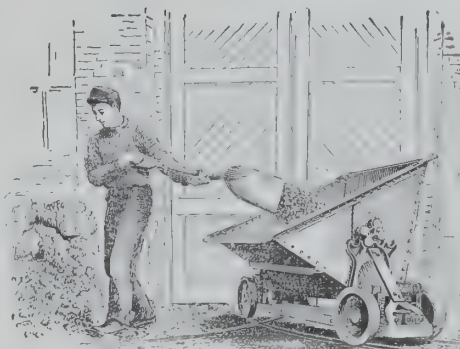


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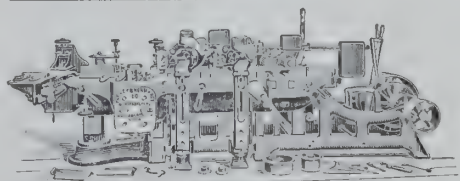
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### U. S. S. Vulcan a Floating Machine Shop.

ONE of the most interesting and important vessels of our fleet in front of Santiago is one that we do not hear much about, because she is not designed for fighting, but to keep other vessels in condition for fighting. While every modern war vessel is a "fighting machine" the *Vulcan* is a movable "machine shop," designed to take the repairing facilities of a good-sized plant right along with the fleet, where they are most needed, so that for anything short of a complete smash-up it will not be necessary for the vessels to leave their station for repairs and refitting. Of course, all our modern steamers have a little machine shop of their own, and the work done is really highly creditable to the engineers and mechanics, but the capacity of a lathe with 14 to 16 inches swing and 5 or 6 feet length, and of an 8 or 10 inch shaper, and a small drill press is necessarily limited, while the job of bending and fitting 6-inch or larger copper pipe, or of retubing several boilers in a short time, mean facilities and men which an ordinary ship cannot possibly have. It is for the purpose of supplying all these needs that the repair ship has been devised.

The *Vulcan* is not, of course, the first ship of this class, several of the more modern European navies being so supplied, as was our own navy during the Civil War. The *Vulcan* being the latest, however, her equipment is a matter of more than usual interest. Added to this is the fact that she is the only one that has seen service in real war.

First in the equipment was a small foundry, although, of course, it was not expected to do much if any casting at sea in rough weather, as the *Vulcan*, when at work for the fleet, would usually be in a sheltered harbor. Besides the foundry, with its cupola, crucibles, etc., the equipment included a very complete machine shop with lathes up to 40 inches swing and 20 feet centres, planers, shapers, drills, etc., coppersmiths, blacksmiths, and boiler-makers' shops, each of the latter being designed to employ fifty men.

In short, an outfit was designed for the *Vulcan* that would enable it to do any lathe work required except for large shafting, and any planer work that would be required by anything short of a complete smash-up of some ship's machinery. Almost any castings which would be needed, short of such a disaster, could be made, and the thousand and one small repairs which are ordinarily made at a navy yard could be just as well made on board the repair ship.

Besides this outfit of machine tools the vessel is supplied with a complete outfit of tools for bench and vise work, hydraulic and screw jacks, etc., and probably the finest lot of engineer's stores ever put on a ship. The list has been selected with very great care and in sufficient quantity to completely equip half a dozen vessels. Round steel large enough for the piston rods of torpedo boats, round Tobin and manganese bronze large enough for air pump piston rods, sheet steel and copper, brass and iron pipe and fittings, packing and sheet rubber in all sizes, give a faint idea of this well-selected and bountiful supply of stores.

There can be little doubt that in future naval wars every fleet which operates away from its own coast will have one or more of these repair ships as an important adjunct.

Since her arrival at Santiago the *Vulcan* has had a busy time. Her men have been divided into three shifts and have kept the tools going the whole twenty-four hours. It would be easier to tell what she has not done, for everything is grist for her mill. To the torpedo flotilla she has been a nursing mother, for these little boats are delicate and have nothing but hand tools. She has made new gun gear, new steam pipes, and practically everything needed.

The brass furnaces are in daily use, and several heats have been poured from the cupola with success for iron castings of a more or less complicated character.

It is to be noticed also that the large number of mechanics enables big working gangs to be sent to the ships for overhauling and repair work on board when that is the most expeditious plan.

The ship has already won golden opinions, and officers of every class are loud in their praises of her great usefulness. There can be no doubt that a vessel of this kind should be attached to every large fleet operating away from home. Vessels specially designed and built for this work would, of course, be better in many ways, but the *Vulcan* is fully answering all that was promised and expected of her.

The need for and the usefulness of such a ship in modern naval operations is only another illustration of the truth strongly brought out during the war now happily ended, *i. e.*, that future naval battles are to be won by

those who have the best machines, kept in the best order, and who are skilled in the use of them—mechanicians who are cool and brave.—*The American Machinist*.

### The Greatest Gains in Exports.

ALTHOUGH the value of the breadstuffs, provisions, and dairy products, petroleum and cotton exported from the United States during the last fiscal year was greater than any total previously reached in those departments of our foreign trade, the difference between 1880-1 and 1897-8 was not very largely in favor of the later year. These figures were \$784,915,600 in the last fiscal year, subject to certain slight corrections, whereas in the fiscal year 1880-1 the total was \$715,153,714. In cotton the comparison favors the earlier year. In the fiscal year 1891-2 the total came still nearer the record-breaking statistics of 1897-8. The figures for 1891-2 were \$742,992,509.

It will be seen that if only the four or five great staples which come pretty directly from the soil were taken into account the exports of the United States in the last fiscal year, while very great and the largest ever known, would not have made a long step beyond the best previous record. The exports of cotton have often reached a greater money value, and that has happened several times in the petroleum trade. The record was broken by less than \$9,000,000 in provisions and dairy products. Yet the grand total of all exports surpassed the previous high-water mark, made in 1896-7, by more than \$180,000,000. The fiscal years of 1880-1 and 1891-2, when the exports of agricultural staples came nearest the figures for last year, were beaten in the total for all exports by \$329,000,000 and \$201,000,000 respectively.

These facts show that the tremendous exports of the last fiscal year, like the unprecedented balance of trade in favor of the United States, were the result chiefly of the recent notable expansion in the foreign business done by American manufacturers. Our most striking and most significant gains have been in the exports which are the product of human skill and labor, to a greater degree than grain, cotton and like staples can be. It is a sign of well-rounded national development which promises unmeasured growth and prosperity in the near future.

**American Trade with China.**—The growth of the trade of the United States with China is strikingly demonstrated in the following table, showing the imports at the port of Chefoo for the quarter ending September 30, 1897:

Description.	1894.	1897.	Increase.
Drills (pieces)—English and Dutch.	11,535	3,585	*7,950
—American .....	25,385	69,295	43,910
Jeans (pieces)—English and Dutch.	2,100	1,100	.....
—American .....	220	1,100	880
Sheetings (pieces)—English.....	12,775	11,770	*1,005
—American.....	36,565	131,835	95,275
Kerosene oil (gals.)—American....	477,100	1,932,560	1,456,460
—Russian .....	†150,000	125,000	*25,000
* Decrease. † 1895.			

**American Steel in Great Britain.**—Scottish steelmakers cannot but regard with keen interest, if not concern, the circumstance that American-made steel is prospecting for, if it has not already secured, an assured footing on this side of the Atlantic among the largest users. In May last the first of a consignment of steel plates of largest dimensions was delivered at Belfast, destined for the shipyard of Messrs. Harland & Wolff, Limited, and it has since been stated that orders for at least 800 tons of similar material are being rapidly executed in Pittsburg for the same firm. The dimensions of the plates are 28 feet by 5 feet, the weight of each being about two tons. It is stated—with what precise amount of truth we have not been able to verify—that these plates are put on the quay at Belfast at from 10s. to 12s. per ton cheaper than can be supplied by Scottish or English makers. About 900 tons of pig iron have also recently been imported to Belfast direct from America, and distributed to various foundries in the town, the price paid, delivered into works, being 46s. to 46s. 6d. per ton. Direct importation into Belfast from the States is favored by the circumstance of two fine fleets of steamers belonging to Belfast—the Head Line and the Lord Line—trading regularly between the Irish port and the States, the freight on the material comparing most favorably with that charged for the same goods between Glasgow and Belfast. The direct importation of all kinds of machinery by these means is decidedly on the increase, and there can be no doubt that Scotch and English makers must suffer in consequence.—*The Engineer*, London.





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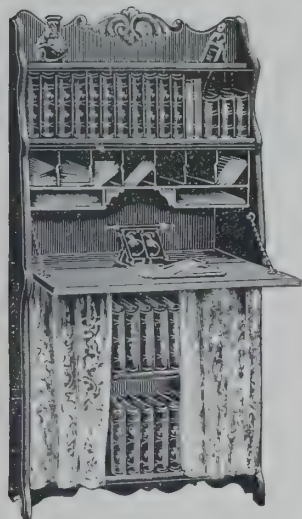
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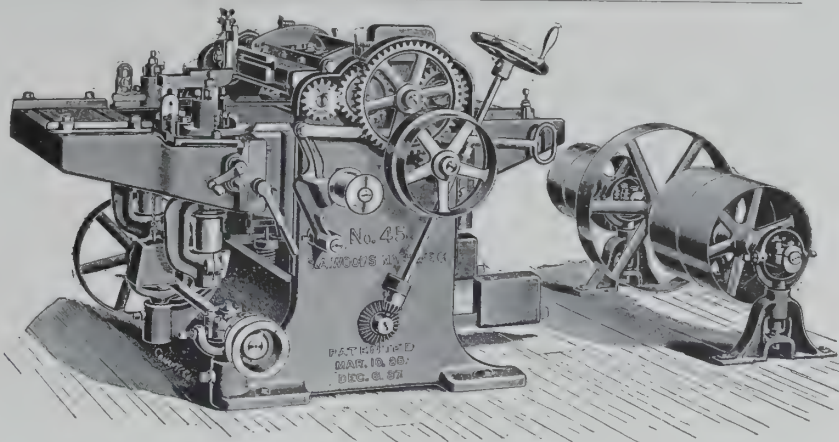
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REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.

MILLS EDWARD Master Schooner "Florence Shay."



### America Leads in Labor-Saving Machinery.

[Translated from *La Agricultura*, Buenos Ayres, Argentina.]

IF there is one thing more than another that makes the United States famous it is their labor-saving machinery, and as designers and manufacturers of wood-working machines they excel all nations. American inventors have no rivals in fertility of invention and ingenious productions, and most of the workshops of the world are supplied with American machines and improved appliances. Although the United States lead the world in the production of labor-saving machinery, without doubt in many parts such machinery is not so well known as it ought to be.

Naturally it will be asked, Why are American machines superior to those made in Europe? The answer is, that in no other part of the world are labor-saving machines so perfect as in the United States, where machines are better devised and more skillfully constructed than in any other country, and probably in greater numbers than in all the other countries together.

It often happens there that the workman says: "Behold here a work which I find myself obliged to do by hand, but I believe a machine can be constructed that will do it." Generally he has already conceived the idea of the machine that is needed; he makes his model or experimental machine, submits it to trial, and very soon it is determined whether the invention or improvement is practicable or not.

The enterprising manufacturers of North America are always looking out for and ready to adopt machinery that will take the place of hand labor and do the work more quickly and cheaply; and as soon as such machinery comes to their knowledge they buy or construct it. In the United States they are ever trying to produce new machinery and to develop and introduce it. In England it happens that they take quite the contrary course. There it is believed that one ought not to invent a machine until there exists a pressing necessity for it or until all the world has become tired of the old methods. Hand work, whether employed in England or elsewhere, cannot perform as rapidly and exactly as the machine; it costs more than machine work, and if this were not so the world would be as poor to-day as it was a century ago, before the machines were invented which are now so extensively used. In the wood-working factories of England one frequently sees in the shops a workman with a chisel and mallet occupied in making a mortise in a window case or door post which could be made in a quarter of the time with a mortising machine.

People of other countries who need implements or machines and tools for their shops, particularly for sawing and wood-working, will find it profitable to study the subject of American improved machinery, and they will find that in this line of American manufactures they can put their confidence; that, as a rule, the goods are cheap and completely satisfactory. Exact and perfect operation, which is the distinguishing feature of American machinery, and is so essential in such as is used in shops, is not generally found in the machinery made in other countries.

### The Depreciation of Tools.

IN estimating the value of a manufacturing plant, either for inventory purposes or for a statement of assets, one of the most uncertain elements to be considered is the real value of the tools. In the case of a machine shop, for instance, large sums have been expended for machine tools, lathes, planers, drill presses, etc., while the motive power, engines, boilers, shafting, pulleys and other details, all represent investments which, while at work, are returning interest upon their cost, but which are also constantly depreciating at an unknown and variable rate.

Investigation of the practice of existing shops reveals almost infinite methods of treating this feature, each shop having its own method and no two systems being exactly alike. Some make no attempt at system, merely estimating the value each year, practically only another name for guessing. Others keep an elaborate record, based on the first cost of each machine, depreciating at a fixed percentage rate each year, quite regardless of the fact that the value may bear but small relation to the cost in the first place, and none at all after a few years.

The question is really one which cannot be answered categorically, and no hard-and-fast rule is possible where so many conflicting conditions enter, but some attempt at system is better than no system at all, even if a certain amount of judgment (or guessing) must be exercised after all. Certain standard tools depreciate very slowly by wear and tear, and if a moderate expenditure is made to keep them in good order, it is practically safe to estimate their value at a cost of their replacement. In most instances, however,

other points must be considered. Among these a very important one is the fact that a tool or machine may be obsolete in a comparatively short time, and although in perfect condition, the owner may simply be unable to afford to use it in competition with rivals possessing machines of later design, greater capacity or more economical performance. The invention of an improved machine for baling cotton, for instance, might render almost valueless hundreds of thousands of dollars' worth of cotton compresses and their attendant machinery, although the latter are now carried as valuable assets in inventory lists. Even when no radical advance is made, the steady improvement in capacity, speed and perfection of product of modern tools is a factor which has the most important influence on the relative value of older machines. In such cases the question is not "How much is the old machine worth?" but "How soon will it be obligatory on us to replace it?"

### Simple vs. Complicated.

ANY word employed to convey a meaning it was not intended to convey is a word misused, and it is just as bad—just as wrong—to misuse a word as it is a tool or a machine; that is, bad from a mechanical point of view, when the misuse has especial reference to mechanical construction. From the mechanics' standpoint it is doubtful if there are two words in the English language more persistently misused than the two standing at the head of this. "Too complex; too much of it; won't do at all; got to have something simple to meet the demands of the times; altogether too many parts," etc., are among the most common criticisms one hears of a machine that is a little better than anything of its sort. Nine times in ten and a great deal oftener, the word complex is used without a thought of anything except number of pieces, notwithstanding each piece may be essential to the performance of something that ought to be performed, in which sense a watch with three hands, or a jack knife with more than one blade is complex.

Take the steam engine as an example. In its early form it was—as the term is used—simple, and it was simply good for nothing. The modern steam engine is complex if complexity consists in many parts, but considering the junction of each of the parts compared with Hero's efforts, it is a simple machine.

Coming down to more recent times, the valve motion of a steam engine consisted of a boy possessed of the usual activity of his kind, but considering how much better an eccentric does the work, is it true to say that the complexity of the machine was increased because more pieces were added? Would it not be correct to say that it was made more simple because it dispensed with the services of the boy?

When Geo. H. Corliss brought out his later-on celebrated automatic cut-off engine it had to fight its way to public favor against the bugbear of complexity, which at length was seen to be simplicity, and the same may be said of most great mechanical inventions. I remember in the earlier days of automatic engines a fairly large one was placed in a manufacturing establishment, where it was severely criticised for its complexity. After performing in every way satisfactory for a short time it met with a slight mishap, not likely to occur again in ten years. Instead of repairing the disabled cut-off mechanism, which could have been speedily done, this mechanism was dismantled and thrown into the scrap heap, a throttling governor put on and in less than two months a boiler was added to the plant to furnish steam for the rejuvenated engine, cutting off at full stroke.

Before condemning any piece of mechanism on the ground of complexity, it is entirely wise to see what the functions of the condemned parts are. If they add to the efficiency of the machine, and are as few as will do the work satisfactorily and economically, the machine is not complex, but may be quite the reverse.—*The Tradesman*.

**Regretted That He Did Not Build Better Machines.**—A well-known machine builder is said to have expressed the rather unusual regret that he did not build a better machine. "The machine in action and principle is all right; if it were not, I would not be building it. But to make it mechanically as perfect as it ought to be would cost from \$30 to \$50 more. This additional cost purchasers will not pay for; and I cannot afford to make them a present of it. The machine is as good as can be made for the price; as good as people will buy; but I wish the trade demanded the highest type of workmanship." There doubtless is much truth in this. A machine builder cannot always build a machine as he would like to, or at least thinks he can't, which amounts to about the same thing. Some machine builders, however, have been very successful in building machines that are thoroughly first-class.



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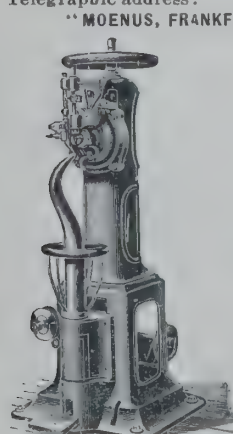
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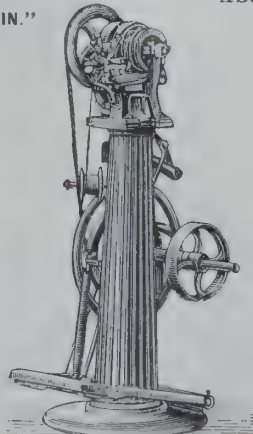
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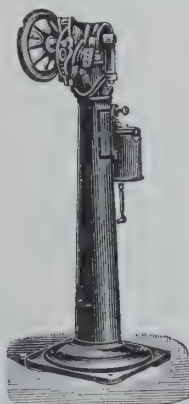
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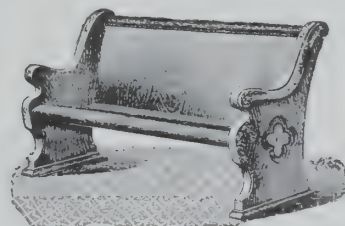
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Double enameled, high finish; Club cards.

202. Sportsman's	2.00	24.00
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Extra enameled; for sporting Clubs.

303. Army and Navy	2.40	28.80
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All linen; for Clubs.

89. Treasury	3.00	36.00
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Finest linen; for Clubs and particular players.

No. 808. Bicycle.

39. Trophy Whist, French size, 2 1/4 x 3 1/2	2.00	24.00
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Fine finish; large indexes; new brand.

93. Ivory Whist, German size, 2 1/4 x 3 3/4	2.00	24.00
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155. Tourists, hard finish; for general stores	.70	8.40
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145. Texan, enameled; for general stores	.90	10.80
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## "National" Playing Cards.

American Faces.

22. Rambler, hard process finish	.70	8.40
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33. Apollo, enameled, aluminum surface	.85	10.20
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133. Columbia, French size, 2 1/4 x 3 1/2; enameled	1.05	12.60
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144. Tennis, French size, 2 1/4 x 3 1/2; enameled	1.80	21.60
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75. National Club, regular size, 2 1/4 x 3 1/2; finest Club Cards	2.50	30.00
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### Manufacturing in the United States.

THE statistical atlas of the United States recently issued from the Census Office contains some interesting facts concerning the condition of the manufacturing interests of the country at the time the census of 1890 was taken. The total value of the products of the various industries of the United States at that time was estimated to have been about \$8,575,000,000, of which 52 per cent. were products of manufactures, 28 per cent. products of agriculture, 12 per cent. of transportation and 8 per cent. of mining.

The capital invested in manufacturing industries in 1890 was \$6,139,000,000, having increased more than fivefold since the census of 1860, and having more than doubled between 1880 and 1890. Both the relative and the absolute increase during the decade was greater than in any preceding ten years, the total invested capital in 1890 having been about \$3,500,000,000 more than it was in 1880.

While the number of manufacturing establishments has increased steadily, this growth has not been so rapid as that of the capital invested. Consequently, the average capital per establishment has become greater. In 1850 the average capital was but \$4,000. By 1860 it had increased to over \$7,000. The figures for 1870 show a slight decrease, but since that time the growth has been constant, the figures reaching \$15,000 in 1890. This increase corresponds in a general way with the increase in the use of machinery.

The number of hands employed in the various manufacturing industries of the country has constantly increased since the year 1850, but the increase has not been as rapid as that in capital or in product. In other words, with the wider introduction of machinery, each hand employed produces a greater output. In 1850 the net output per hand employed was about \$500. In 1890 it had increased to nearly double this amount. The statistics prepared show that a portion of this increased productiveness of the laborer has gone to his benefit, since the average wages per hand has increased from about \$250 to \$440. Thus, while his efficiency has doubled, his pay has increased 75 per cent. The remaining 25 per cent. of his increased efficiency went to capital, which, through the introduction of machinery, increased again the efficiency of the workman.

The principal manufactures of the country, grouped according to the value of their gross products, show that lumber leads the list. The output of this product for the year was valued at nearly \$600,000,000. Flouring mills and clothing factory products follow closely after lumber, each with a value exceeding half-a-billion dollars. Iron and steel products were in fourth place, followed by foundry and machine-shop products, both values being over \$400,000,000. The cotton industry had a product valued at \$270,000,000, while that of the woollen and worsted industry was \$220,000,000.

### Setting Type by Machinery.

ONE of the most remarkable inventions of recent years and one whose inception and most complete and practical development have taken place in the United States is the composing machine, with which may be included kindred devices of whatever name whose purpose is the same—to do away with the labor of hand composition in newspaper and printing offices. It would be too much to assert that no invention whatever along this line has as yet appeared in other countries than the United States, but as a matter of fact up to the present time none of the systems thus far devised abroad appears to have won any considerable amount of favor even in the country of its origin. On the contrary, no less than six distinct systems are in successful operation at the present time in this country and fully a score of machines, some of them embodying radically new principles, have reached a sufficiently advanced experimental stage to be patented, either wholly or in part.

As a result of this competition, each manufacturer has been spurred on to the utmost in his efforts to produce the most perfect machine on the market, and improvements have followed one another with almost bewildering rapidity. One firm alone is said to have expended nearly \$100,000 in improving a single feature of its machine. The result of all this is that the newspaper and printing office, in no matter what part of the world it may be situated, that desires to keep fully up to date and to install the most efficient labor-saving plant possible, must investigate one or all of these great American firms.

During the last few years, since the success of these machines has been demonstrated, thousands of them have been sold in this country alone. No metropolitan daily is without its "battery" of type-setting machines, and few

large job printing offices are without at least one. This wide test, under ever varying conditions, gives to the users of these American machines the utmost possible security and guarantee that they will perform the purpose for which they are intended to the buyers' satisfaction.

At one time it was thought that while composing machines were suited to newspaper work they were not adapted for book or magazine work. Now, however, it is generally recognized that this idea is groundless, and these machines are in use on many high-class magazines and in book printing offices where the finest work is done. Of course, the skilled composer is still required in these offices. As in the case of wood carving, there are grades of work that can only be done by hand, so there are classes of printing that can be done much cheaper and better by hand than by machine. But this fact does not prevent the composing machine from occupying a broad field of usefulness and saving to its purchaser more than its initial cost again and again.

### American Locomotives in Japan.

IT seems from what we have been informed by the authorities that it was from 1896 that railway engines made in America began to be imported into Japan to any perceptible extent. Up to that time, against 175 English engines used on the Tokaido line, there were only six engines of American make. But since then more than seventy engines have been imported from America. This growing predominance of American over English engines is partly due to cheapness and partly to the promptitude with which orders are attended to. An American engine, made at Philadelphia or New York or New Jersey, costs, including freight and sundries, 19,000 yen, against 24,000 yen for an English locomotive. Further, chiefly owing to the outbreak of the engineers' strike, and later to the extraordinary activity of naval and merchant marine architecture, the orders in England have been very slowly executed, and forty engines sent for in 1896 have not yet arrived. That is not the case with America. But though there the recent tendency lies in the direction of the gradual superseding of the English engines by American, on the whole, however, those of English make still predominate over the others, the American engines, as above stated, being of only recent introduction.

The railway authorities have been engaged since last year in carrying out experiments with the American and English engines, but the investigation remaining as yet incomplete no definite verdict can be pronounced on the relative merits of the two kinds of locomotives. That the American engine consumes a larger quantity of coal compared with the English seems to be well established. As to the relative cheapness of the American engine, it ought to be remembered that the materials used by the English and American casters are not similar, so that it is impossible to pronounce any definite judgment in that respect alone on the question of the relative merits of the two engines. However, one point is certain, namely, that the American foundries utilize mechanical power to a larger extent than the English.—*Japan Weekly Times*.

### Exports of American Coal.

THE extension of foreign trade in American coal is at last beginning to assert itself across the Atlantic and already several prominent English journals state that the presence of American coal in the British markets is startling proprietors of collieries in England. The fact that shipments of coal from West Virginia and Southern ports is as yet only in the experimental stage only more clearly defines the intentions of American coal mine operators to extend their sales and exports abroad. This they will be enabled to accomplish, because freight rates tend to a still lower basis, and with the continued improvement in mining machinery and its steady and increasing introduction into mining operations, the cost of the product will be materially reduced, thus giving the aggressive mine owner additional advantages over his European competitors. While the foregoing has more particular reference to bituminous coal, it is applicable to anthracite, and it is gratifying to note that the anthracite association recently incorporated at Scranton, Pa., is about to send emissaries to Europe to endeavor to introduce its product abroad. With the steady reduction in the cost of production, together with low rates of freight, the export of coal of all kinds from ports on the Atlantic should increase in the same ratio, and there is scarcely a shadow of a doubt that American push, enterprise and aggressive tactics will prove equal to the task of making its shipments of this commodity felt in the Old World. The fact that English technical papers are taking so much notice of the matter is sufficient evidence that they begin to speculate upon what would be the effect of large exports of coal from America into their markets.





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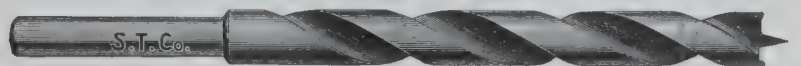
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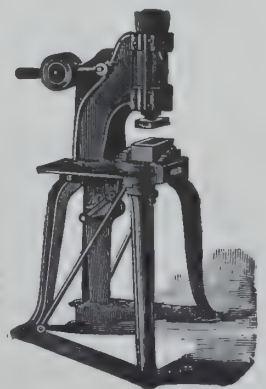
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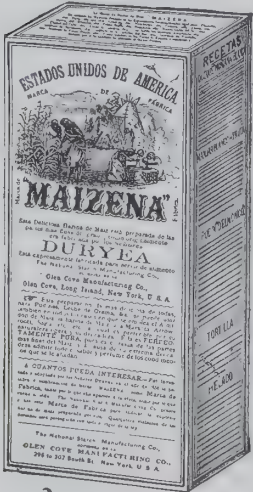
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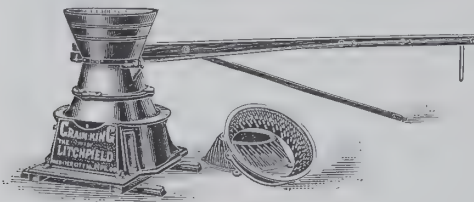
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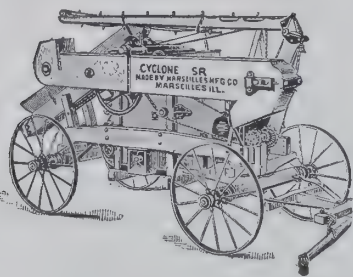
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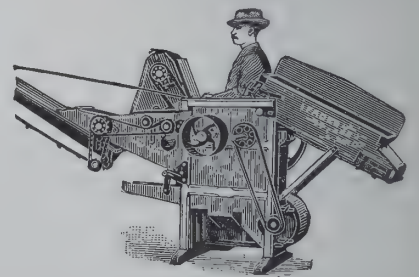


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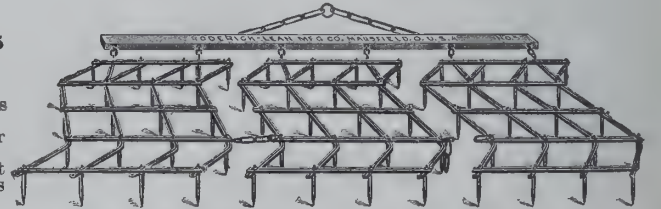


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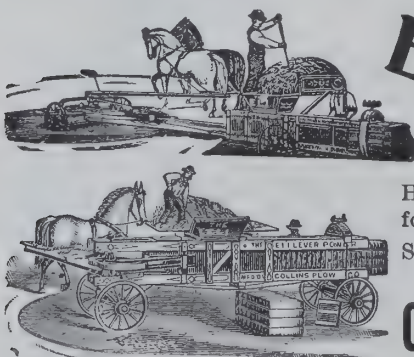


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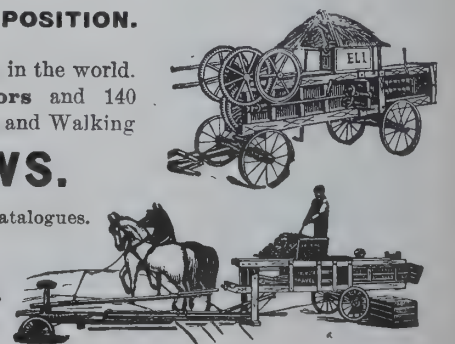
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### Exports of Agricultural Machinery.

IN no line of our manufactured exports has the increase been so steady and satisfactory as in the case of agricultural machinery and implements. We have already had occasion more than once to point out some of the reasons for this in this column. For the present, however, we are not so much concerned with causes as with results. For a great many years the exports of this description have been large. As long ago as 1870 they passed the \$1,000,000 mark, the exports for that year being \$1,068,092. Ten years later they had more than doubled, having reached the very respectable total of \$2,245,742. The following table shows the progress from that time to the present:

1885 .....	\$2,561,602
1890 .....	3,859,184
1896 .....	5,176,775
1897 .....	5,240,686
1898 .....	7,609,732

Of the great total attained last year mowers and reapers and parts of the same are credited with no less than \$5,500,665, a greater sum than that represented by all the exports of agricultural machinery and implements combined last year. The value of mowers and reapers exported last year was \$3,127,415, or almost two and a half millions less. Plows and cultivators also show an amazing increase, from \$590,779 last year to \$927,250. The following table may be of interest as showing who are some of our chief customers for these goods. It is unfortunately incomplete, Russia notably being omitted, owing to the fact that the Treasury Department has not as yet included Russia in its preliminary statistics:

#### EXPORTS OF AGRICULTURAL MACHINERY AND IMPLEMENTS.

Country.	1897.	1898.
United Kingdom.....	\$642,317	\$1,145,025
France.....	623,956	1,252,167
Germany.....	710,818	1,232,242
Other Europe.....	1,070,241	1,451,284
British North America.....	464,959	781,415
Central America and British Honduras..	35,925	14,910
Mexico.....	130,825	124,368
Santo Domingo.....	1,428	1,079
Cuba.....	3,624	7,817
Puerto Rico.....	4,239	2,504
Other West Indies and Bermuda.....	6,705	7,432
Argentina.....	415,312	377,054
Brazil.....	23,626	24,755
Colombia.....	3,362	4,843
Other South America.....	140,117	196,054
East Indies—British.....	8,708	8,333
British Australasia.....	490,985	697,565
Other Asia and Oceanica.....	46,206	56,159
Africa.....	417,333	224,306
Other countries.....		420
Total agricultural implements.....	\$5,240,686	\$7,609,732

### State of Trade—Increased Activity in All Lines.

R. G. DUN & CO.'S weekly review of trade says: "The smallest failures ever recorded in any month for five years were those of August. No other months since the monthly reports were commenced by *Dun's Review* exclusively has shown defaulted liabilities as small within \$1,000,000, and the ratio of such defaults to solvent business represented by exchanges through all clearing houses, only \$108.70 in \$100,000, is smaller by 26.5 per cent. than in any previous month, the clearings having been the largest ever known in August, and 23 per cent. larger than in 1892.

The enormous volume of business in a month usually one of the most inactive of the year demands attention. Postponement during the months of war of some contracts and purchases which have now come forward explains part of the increase, and the strong absorption of securities explains part, but there has also been a great decline in the average of prices for all commodities, so that it takes a much larger volume of business in tons or

bushels to make transactions amounting to a million or more than warrant in 1892. It is, therefore, strictly true that business is larger than in the very best of all past years, and yet there is every prospect of much further increase. There is no doubt that the wheat crop, even though it may fall a shade below some estimates, will prove the largest ever harvested, and although Beerbohm estimates Europe's crop at 232,000,000 bushels more than the last, that would be only about an average yield, while other evidence is less favorable.

The improvement in the iron industry has not only continued, but becomes more impressive because, after enormous buying of materials has satisfied the needs of great consumers for months to come, the demand for products is so great that both materials and products gradually advance in price. Bessemer pig has risen to \$10.55 at Pittsburg, local coke at Chicago and anthracite foundry at the East are strong, also bars and plates advanced a shade, with most structural plate mills filled with orders for months to come, and 25,000 tons rails sold at Chicago for delivery next year. The advance in tin plates, in spite of production far greater than was thought possible not long ago, is evidence that the consumption of steel in that branch will be heavy. The wire works also report a better demand, and the output of Connellsville has started up, gaining 10,000 tons for the week.

Reports from the iron and steel trade are in a high degree favorable, the tonnage movement being unprecedentedly large, and the tone of prices firm at the advances recently scored. Business in steel is exceptionally large, and in the West particularly the outlook is limited only by the ability of the mills to keep up with orders.

### The Cotton-Seed Oil Industry.

THE cotton-seed oil industry in this country has been entirely developed since 1870. Previous to that time nearly all the work done was of an experimental nature, and, in fact, one peculiar feature of the entire development along this line is that it has been carried on in a more or less timid fashion, the promoters seeming to be in almost constant fear of failure.

In 1867 there were only four cotton-seed oil mills in the United States. There are now over 300, some of which are of considerable size. Nearly one-third of the entire number are located in Texas. There are now produced in this country an average of about 4,000,000 tons of cotton seed per year, having a value of \$113,000,000. Deducting from this quantity about one-third for sowing there would remain over 2,500,000 tons of seed. Of this amount about 1,500,000 tons are worked up in the oil mills, each ton producing an average of 45 gallons of crude cotton-oil and 800 pounds of cotton-seed oil cake. At average prices this oil has a value of \$18,000,000, while the amount received for the oil cake exceeds \$12,000,000. About 9,000,000 gallons of this oil is used in making "compound lard," while most of the rest is either exported or used in the manufacture of soap. Considerable quantities are also used each year in adulterating lard, olive, sperm and other oils.

The mills produce, in addition to the oil, much excellent fertilizer, also some millions of dollars' worth of feed for animals and raw material for paper mills. The hulls are one of the most valuable parts of the seed. They comprise 48 per cent. of the weight of the seed, forming, in a dry and loose condition, an admirable stock food. For many years the hulls were thrown away as valueless, but to-day every mill in the South finds ready sale for its entire output. Therefore, as the result of a little over a quarter of a century of invention and the application of capital and energy to the work of giving a commercial value to cotton seed, this waste product has become worth one-half, and in many cases even more than one-half, as much as the lint for which the plant is raised.

The products of the cotton-seed oil mills have become an important item in our domestic exports. It is almost impossible to follow the growth of the exports of cotton-seed oil cake, because all oil cakes are grouped together in the official statistics of the Treasury Department, but the advance in cotton-seed oil exports can be clearly traced. The product first appears as a separate item among the exports from this country during the year 1872, when the value was \$293,546. By 1880 these exports had increased to a value of \$3,225,414. By 1888 the figures had declined to \$1,925,739, while two years later (1890) they amounted to \$5,291,178. In 1897 the figures were \$6,897,361, while for 1898 they reached the highest point yet attained, \$10,137,619. Of this amount in 1898, \$3,617,133 worth went to France, \$639,312 worth to Germany, \$629,679 worth to the United Kingdom, while the quantity sent to all other European countries had a value of \$3,977,385, Europe taking, therefore, nearly the entire exportation.



### The Era of Great Railroads.

THE Baltimore and Ohio Railroad reorganization is the latest of the series of reconstructions of bankrupt railroad companies which have been going on, at intervals, ever since the financial collapse of 1857. When it shall have been completed, there will remain only the Central Pacific Railroad Company to undergo the operation, and with the rearrangement of the finances of that concern will disappear the era of railroad receiverships and its replacement by one of new corporations to take charge of the properties which, in so many cases, have been managed by officers of the Federal and State courts. The twentieth century will, therefore, probably see the railroad business of the country entirely in the hands of solvent owners, in good financial credit, and meeting all their obligations promptly.

More important than the rescue of railroads from judicial supervision is the consolidation, with which it has been in most cases accompanied, of numerous small and independent properties into a few of large dimensions. In this respect bankruptcy and reorganization have merely facilitated and hastened a change which would have been ultimately accomplished without them, but their assistance has been none the less valuable in accelerating it. Railroad construction in this country, as elsewhere, began with short local lines, which it has taken many years to combine into the great systems that we now see. It is only a little more than half a century since the traveller from New York to Chicago went to Albany by one railroad, thence to Schenectady over another, thence to Utica over another, thence to Syracuse by another, and thence to Rochester, to Lockport, and finally to Buffalo by others. At Buffalo he could go by steamboat to Detroit, and thence by the sections of railroad from Detroit to Chicago which now compose the Michigan Central Railroad, or, he could go by rail all the way over the sections of which the Lake Shore Railroad is now constituted, changing cars at Erie, Pennsylvania, in order that the citizens of Erie might not lose the sale of refreshments to him while he was detained making the change. In 1853 the separate sections of railroad between Albany and Buffalo were consolidated under the name of the New York Central Railroad, and in 1869 the Hudson River Railroad was added to the New York Central. The same year the Lake Shore Railroad was formed, embracing the entire line from Buffalo to Chicago. Recently the New York Central has acquired the ownership of the Lake Shore system, so that, instead of a string of tickets a foot long being required for the trip between New York and Chicago, one ticket suffices for the whole of it.

A similar unification has taken place in New England. First, the New York and New Haven Railroad, built in 1849, was consolidated, in 1872, with the New Haven and Hartford, built in 1844; then, the separate links extending from New Haven to Boston were one by one added; then, the entire Old Colony system, itself a combination of many small roads, was taken in, and, recently, the New York and New England. This brings the entire railroad system of Southern New England under one management, and by a corresponding series of amalgamations, that of Northern New England, including Maine, is now controlled by the Boston and Maine Railroad Company.

Whatever may be said of the peril to the individual citizen of this massing together of thousands of miles of railroad, and of the dangerous power which is intrusted to the men who collect and disburse their earnings, there is no controverting the proposition that such is the tendency of civilization. As England joined to herself Wales, Scotland, Ireland and her colonial possessions; as Louis XI. consolidated France into one kingdom; as Victor Emanuel converted Italy from a "geographical expression" into a nation; as Bismarck completed the work of Frederick the Great by absorbing into the German empire dozens of little kingdoms and principalities, and as we are now carrying the Union, founded in 1776 and solidified in 1865, to Cuba, Hawaii and the Philippines, so great railroad kingdoms are gradually forming themselves out of numerous little ones. It is as useless to deplore it as it is for parents to deplore the growth and coming to maturity of their children. Living organisms cannot stand still, they must expand and develop themselves, and in the affairs of industry as in those of politics, feeble and inefficient organizations must either combine and become strong ones, or surrender to stronger ones which take their places.

One thing at least is beyond dispute: the cost of railroad transportation to the public has not been increased, but, on the contrary, has been diminished, since the numerous little railroad companies of fifty years ago have been succeeded by the few great ones of the present day. How cheap, and at the same time how comfortable and even luxurious, passenger travel has become, every one knows by experience, and as to freight, the prices for which it is carried are but a small fraction of those which at one time were universally

prevalent. It is also undeniable that no further reduction could be accomplished by returning to former conditions. Splitting up our present great railroad systems into their original fragments would, on the contrary, increase expenses and make an increase of charges inevitable.

Indeed, were it not for the reduction of fixed charges, as well as the reduction of operating expenses, which the consolidation of railroad properties has effected, the companies could not, at the prices they now receive, afford to render the public the service they now render.—MATTHEW MARSHALL, in the *New York Sun*.

### Exports of American Locomotives.

AMERICAN locomotives are steadily growing in popularity in both hemispheres. Within the past twelve years the annual exports of these products have increased from 52 to 338. In the following table further particulars in regard to the exports of American locomotives are given, showing aggregate and average values:

Year.	Number.	Value.	Average Value.
1886.....	52	\$ 333,393	\$6,414
1887.....	58	373,245	6,435
1888.....	56	407,014	7,268
1889.....	144	1,227,149	8,521
1890.....	161	1,280,060	7,954
1891.....	275	2,424,363	8,816
1892.....	197	1,717,715	8,719
1893.....	195	1,794,709	9,203
1894.....	142	1,028,330	7,241
1895.....	252	2,397,519	9,442
1896.....	261	2,512,270	9,625
1897.....	338	3,225,831	9,514

From the manner in which the present year has started out it is likely that all former records in this direction will be broken. Up to the present time, with barely more than six months gone, 270 American locomotives have been shipped to foreign countries.

**Freight Rates to Australia**—As a result of the establishment of a direct line of steamships between New York and the principal Australian ports, within the past two or three months freights between New York and Australian ports have been reduced by nearly 50 per cent. This will undoubtedly have the effect of increasing American trade with Australasia.

**American Agricultural Implements in Algiers.**—The light agricultural machinery is all of American make, and is very suitable to the requirements of the colony. The plows used by the French colonists are chiefly of American make, but have never been looked upon with favor by the Arab farmer, who still scratches the ground with a plow of most antiquated and utterly useless pattern, as did his father and his father's father before him.—*Report of the British Consul-General.*

**A Heavy Freight Train.**—What is said to have been the largest freight train ever hauled anywhere in the world ran eastward from Altoona to Columbia recently over the Pennsylvania Railroad. The record-breaker was made up of 130 cars of Amboy coal, which made a train 3,877 feet in length, a trifle less than three-quarters of a mile. The total weight of the train behind the tender of the engine was 5,212 tons, of which 3,693 tons was the weight of the coal. A single engine, No. 872, the first of the Giant H 5 class, hauled the enormous string of cars. This locomotive weighs about 118 tons, and has demonstrated its title to be the strongest machine on wheels in the world. On the Pittsburg division it hauled more than twice as much as the standard class "R" freight engine at every test. The ordinary Pennsylvania train is made up of sixty cars weighing about 2,350 tons.

**Cycle Share Values in England.**—"I have taken the trouble to examine the 'cyclist' share list, as published in one or two of the cycling journals," says a writer in a London paper, "and I find that out of 192 cycle companies tabulated, about a hundred are recorded as having no buyers, which means, as regards the great majority, that their shares are worthless, or practically so. The shares of most of the companies are of the nominal value of 20s., and on the majority of them that amount has been paid, but they are now being offered at all sorts of prices between threepence and par value. A more absolute slump was probably never recorded in connection with any important industry, inherent, at any rate, in causes that were capable of being controlled. This is a curious and interesting commentary on the disclosures which Mr. Hooley has this week been making before the Registrar in the London Bankruptcy Court."



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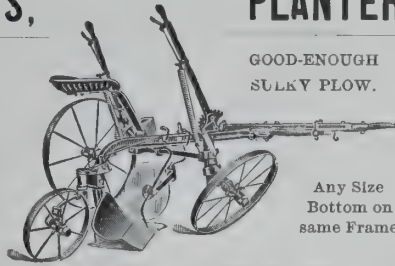
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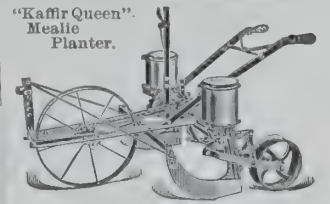


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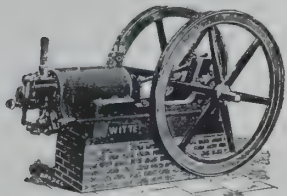
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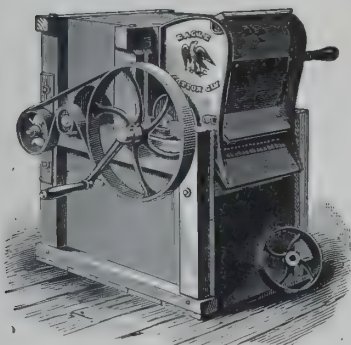
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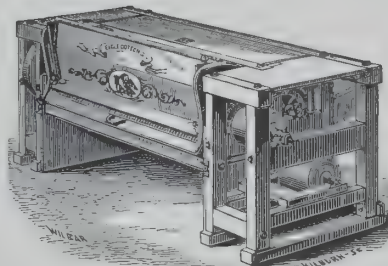
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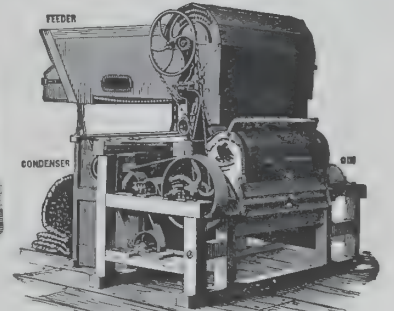


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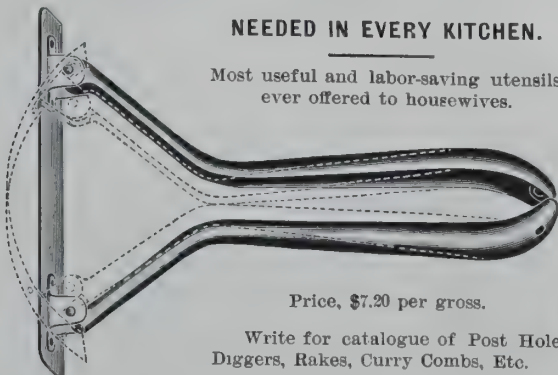


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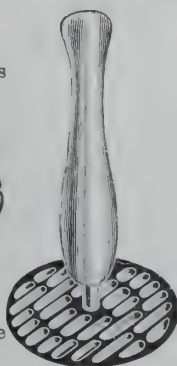
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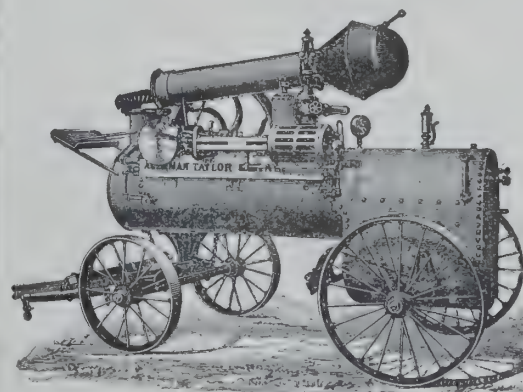
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## Engineering Lessons from the Hispano-American War.

SEA-FIGHTING has changed completely since the days of the Spanish Armada. It is also entirely different from what it was in the days of Nelson. Instead of the wooden ships of the olden time, armed with cast-iron or bronze smoothbores using spherical ammunition, we have the modern cruiser and battleship. It is said that the *Oregon*, which may be considered one of the best types of modern battleships, is provided with about 100 steam engines, used for different purposes. Moreover, there is an extensive electrical plant. The manufacture of the vast and intricate machinery that one finds on a battleship of this kind requires an immense amount of skill, and the intelligent operation and care thereof require almost as much more. It does not require much skill to manipulate light projectiles, but it evidently requires a high order of skill to understand and work apparatus for moving heavy projectiles and charges by means of steam or electricity.

The Spaniards were able to purchase some of the best cruisers in the world. They were also able to provide themselves with a considerable number of torpedo boats and torpedo-boat destroyers. Several of these were made in England. The machinery in them was of the highest order known to modern steam engineers. The Spaniards were also able to purchase excellent guns and ammunition. The Americans, on the other hand, built their own ships and made their own guns, and the very fact that they were obliged to do this gave them the necessary skill in their management afterwards. Five or six large cruisers which Spain had at the beginning of the war were supposed to make from twenty to twenty-one knots per hour.

It was expected that this powerful, swift fleet of armored cruisers would do a great deal of damage to the American coast. It was claimed at the time that the Americans had but one ship which was their equal in both speed and armament—namely, the *New York*. It was believed in Europe that the Spanish cruisers could run away from the American battleships and outfight the American cruisers.

When I was in Paris at the beginning of hostilities, nearly every one said that the Spaniards would have altogether the best of it for the first five or six months; that the American fleet would be practically annihilated, and that probably New York and Boston would be bombarded.

The first important event was the attempt of the Spaniards to escape from Santiago. They had noticed that the Americans held religious services on Sunday morning; they believed that steam pressure would be low, on the American vessels, and that they might be caught napping; moreover, the swift *New York*, which they feared most of all, was ten miles away. This seemed an excellent opportunity to escape. It was said that the cruisers were able to go about five knots per hour faster than the American battleships, and it appeared to the Spaniards that they stood a very good chance to show them a clean pair of heels with the exchange of but a few shots. When, however, they came out of the harbor, it was found that only one of their ships, the *Cristobal Colon*, was able to go faster than the American battleships, and they very soon found themselves paired off with American ships fast enough to be able to choose their own range. By taking advantage of the superior skill of the American gunners at long range, the Americans were able to annihilate the Spanish fleet in a short time, with practically no loss to themselves. But it may be said that the American battleships were infinitely stronger than the Spanish cruisers. This certainly cannot be said in regard to the triangular fight between the two powerful Spanish torpedo-boat destroyers and the little American yacht, *Gloucester*. Sidney Low, writing in the *Pall Mall Gazette*, after speaking of the total destruction of the Spanish fleet with practically no loss on the part of the Americans, points out that the determining factor is the man who fires the gun, the man who wings the torpedo on its way, the man who pulls the lever in the engine-room, the man who has the nerve and skill to use the ram. If he is not capable and resolute, all the rest is nothing. Speaking of the *Gloucester*, he says:

The *Gloucester's* fight with the two torpedo-boat destroyers is enough to make one distrust all paper calculations forever. Theoretically, Lieutenant Wainwright's vessel should have been a sinking wreck five minutes after she had the temerity to challenge the *Furor* and the *Pluton*. The American vessel was a lightly built yacht hastily turned into a warship by having a few six-pounders and three-pounders mounted on her decks. The two destroyers are supposed to represent the very latest results of modern naval architecture. They were built in English dockyards, and they are fitted with enormously powerful engines, which are supposed to give them a speed of twenty-eight or thirty knots an hour—ten knots at least faster than their victorious antagonist. They carried fourteen-pounders, six-pounders, and

Maxims, and, according to certain of our authorities, two or three of them ought almost to be a match for a battleship. But the yacht simply smothered them with her well-aimed gun fire, and drove them ashore in flames, without receiving a touch herself! It is a most astonishing triumph of mind over matter—of skill and spirit and judgment over men handling immeasurably superior weapons and lacking the capacity to use them effectively.

The American gunners had been highly trained; large sums of money had been expended in ammunition to be used in target practice at sea. Every man knew his gun, and had confidence in himself, while the greater part of the Spanish gunners probably fired the large guns of their fleet on the morning of the action for the first time.

There can be no question that the Spaniard individually has quite as much personal bravery as the American, but he has no taste for machinery, is not an engineer, and is completely without the skill which is necessary in order to understand and handle the ponderous and complicated machine that one calls a battleship or cruiser of to-day. Hand-to-hand sea fighting is a thing of the past; naval battles are engineering conflicts between machines, and the man who understands these machines best is the man that is sure to win.

Before the battle of Manila the Spanish Government seemed confident. They pointed out that they had more ships at Manila than the Americans could possibly bring against them; moreover, the place was well fortified. However, notwithstanding that the Spaniards in their fortifications and ships had considerably more guns than the Americans, the fight was of short duration, the Spanish fleet being destroyed in a very short time, while not a man was killed on the American side. Here again it was a triumph of technical skill and high training over a complete lack of skill and what one might call criminal negligence on the part of the Spaniards.

The Spanish officers and gentlemen are as intelligent and as refined as those of any country; many of the merchants and bankers conduct their business with great skill and care, and accumulate large fortunes. In no part of the world are there greater integrity and honesty in commercial transactions than in Spain; no merchants stand higher than the Spanish. In literature they are perhaps superior to ourselves, while in art they have far surpassed us; but they have no taste for engineering, and it is impossible for them to appreciate the necessity of taking good care of machinery.

The Spanish and French newspapers, at the beginning of the war, referred to the United States as a nation of *commerçants* and pigstickers. Had they referred to them as a nation of engineers and skilled mechanics, they would have been much nearer the mark. If there is anything in the world which distinguishes the American, it is his taste—may I say his love?—for the mechanical arts. All the young men are extremely fond of machinery; they all wish to make something—to build a steam engine or a boat, or to make a gun, and it is this which gives the American, and the Anglo-Saxon everywhere, an advantage over the less skillful nations of the world.

The complication of modern implements of destruction gives to the highly scientific and mechanical races a marked advantage over the untrained and unscientific nations. The greater the complication, so long as advantages may be derived from it, the greater the skill required to understand and use the instrument, the greater the supremacy to be derived from its use. I think it may almost be said that naval warfare has reached so high a degree of development and requires such a mass of intricate and complicated machinery as to render it completely useless to unscientific nations. The wisdom of a government in insisting that everything relating to warfare should be constructed in its own country is apparent. If a nation makes its instruments of warfare, it will certainly be able to use them.—*Hiram S. Maxim, in The Engineering Magazine.*

**The Handiness of Machine Tools.**—The handiness of machine tools receives frequently too little consideration from British makers. Not long ago we visited a works where some large drilling machines made by a very well-known firm were in use, the various handles and levers of which were particularly well arranged, but when we remarked on them we were informed that it was only after insisting on that arrangement, and absolutely refusing to accept the machines till they were put right, that the desirable point was gained by the purchasers. We have very little doubt that the makers have not profited by the hint, but still continue to make the machine in the old style, although the improvement could not fail to be evident to all users. We have no hesitation in saying that such a case could never occur in America, the fact being appreciated that the rate of output of a machine depends largely on the convenience with which it can be used.—*The Engineer* (London).





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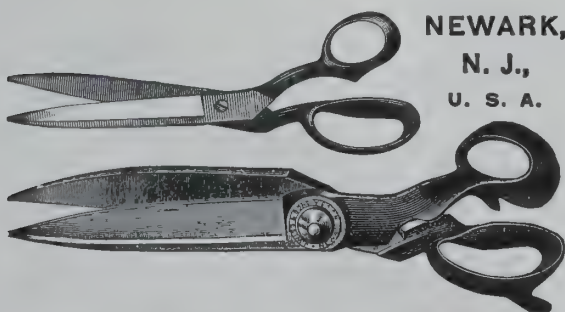
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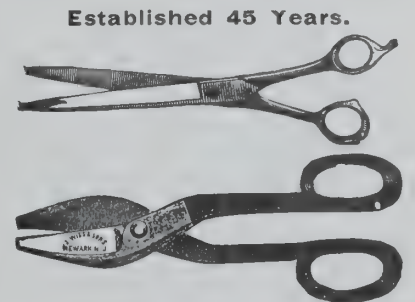
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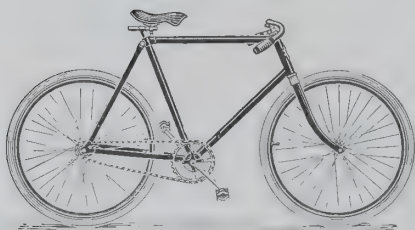


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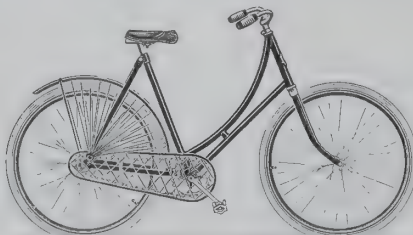
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**ARENA MODEL M.** Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



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**ARENA MODEL L** is very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



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Model 350 is built for road racing and for all purposes where a light wheel is desired. The frame is built in 23-inch height only. Drop to hanger, 2½ inches; 7-inch cranks; Tribune special single-tube racing tires. Weight, about 21 lbs. Finish, black, gold striped.

**We build also a large variety of higher-priced wheels, including TANDEM, TRIPLETS, ETC.**

Handsome illustrated catalogue describing our full line, **MAILED FREE.**



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**Nile and Pyramid Bicycles and Tandems**

High-Class Bicycles for Export.

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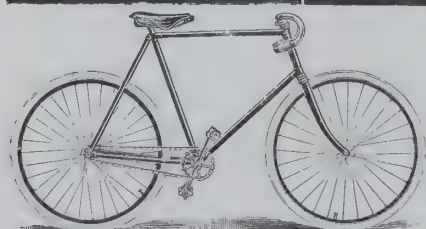
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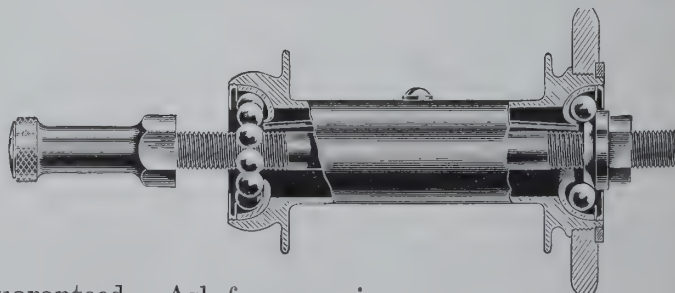
**HUNTER ARMS CO.,**

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**Hunter and Fulton Bicycles.**

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Everything we manufacture is strictly high-grade and fully guaranteed. Ask for our prices.





### The Outlook for 1899.

IT is not perhaps too early in the season for a little gossip regarding the prospects for the coming season as they present themselves to American manufacturers. It is too soon to state positively what the developments of the coming season will be, and in the cycle trade above all others it is never safe to prophesy, unless you know. But the readers of THE AMERICAN EXPORTER may at least gain some idea from the following as to how the wind is blowing over here.

All indications are that the remarkable tumble in the price of high-grade—we are now speaking of genuine high grade, not spurious—wheels that was such a feature of the past two years in the American cycle trade will not be again repeated. The prices for wheels of the standard makes have now settled at points that on the whole appear to be satisfactory to both maker and buyer. We are speaking now of chain wheels. The price of the chainless will in all probability fall heavily until it reaches a notch not too far above that of the standard chain wheel of equal grade.

As the chainless is on the whole less of a novelty in Europe than it is here we do not anticipate any unusual increase in the exports of this type. The chain wheel, however, of the best grade, manufactured by responsible firms, will enjoy a greater popularity abroad than ever. We believe that the export cycle trade done with auction shops, receivers and curbstone hucksters of all kinds will fall off a great deal, to the advantage of legitimate firms who do a straightforward business and whose guarantee means exactly what it says and will be backed up on occasion.

As regards general make-up and appearance, it is too soon to state what the features of the coming models will be. There is some talk of a return to 30-inch wheels on the part of a few makers, but these will probably be put out at first in experimental numbers only.

Tiremakers are just now announcing an increase of 50 cents per pair for manufacturers. This no doubt means a somewhat larger increase for dealers. By this time foreign buyers should have learned the lesson that tires should never be purchased of any but responsible firms and that to be good for anything living prices must be paid. All things considered, we believe that American manufacturers are capable of making a better tire for little money than any others in the world. Automatic machinery, long experience, large plants and an enormous domestic demand all contribute to this result and so favor the foreign buyer.

The prices of tubing are said to be going up, but at present this cannot be asserted positively. We doubt if there will be much difference for export buyers, except in quality, which will undoubtedly be better than ever before. There are several immense plants in this country devoted exclusively to the manufacture of bicycle tubing, and we confidently expect to see a great development in the foreign trade in this important specialty as soon as foreign buyers realize its merits.

An enormous trade will undoubtedly be done the coming season in bicycle parts, so many of which are now made in this country with the aid of highly specialized automatic machinery. We have more than once referred in these columns to the special cycle-making machinery now on the market in this country, and not only will manufacturers continue to avail themselves as heretofore to equip their works, whether in Great Britain or South Australia, with these machines, but there will undoubtedly be a constantly increasing stream of orders from dealers all over the world for such articles as chains, cranks, sprockets, etc., manufactured in this country by concerns that are devoting all their energies and ability to a single one of these specialties.

In handle-bars, brakes, bells and saddles, lamps and the numerous other essential accessories it is too soon to prophesy what the future has in store. In all of these lines there is more room for sensational developments than seems possible in the case of the complete machine. Saddles, however, appear to have already reached a wonderfully high stage of perfection in this

country, and we anticipate an advance over the immense export sales last year of these staple articles.

In general foreign buyers the world over appear to be increasingly disposed to favor American models in every part of the bicycle's equipment. Each succeeding year will see the trade of the great and reliable American manufacturers of bicycle goods increasing abroad. Importers and dealers have only to use discretion in placing their orders to insure lasting satisfaction both for themselves and their clients.

### Export Trade in Parts.

THE plan which has been prevalent in Austria for some time of buying parts and assembling them after receipt at the consignees' port is now taking a hold in Australia. It is reported upon excellent authority that complete machines are fast giving way in the Antipodes to the built-up class, and the reason for it is the same as with Austria—the duties are decreased, while the results are practically the same. This gives a particularly favorable opening for parts-makers, and one which they should not overlook, as it appears the innovation is sufficiently well grounded to last for some time at least, if not to become permanent. English makers have so far profited the most by the new arrangement, and, in fact, they are almost directly responsible for it, but the better-made and lighter and interchangeable parts made by American concerns will not have a very hard battle in securing the supremacy.

The best method of conducting this trade has been to show a completed machine with the parts necessary to its building numbered separately, so that while the complete machine is ordered in the "knock-down" shape, it comes under the tariff on separate parts. A thoroughly informed agent in Melbourne says that American machines so ordered and imported will soon dominate that market. We note also that a recent single shipment to Buenos Ayres included over \$2,000 of bicycle parts and equipments.

### Expanding American Trade.

A STRIKING view of the growth of this country in industrial and commercial affairs is that prepared from statistics gathered in Sweden as analyzed by the British Consul at Stockholm. The tables are carefully made up and the comment upon them, as might be supposed, is entirely impartial. Periods of five years each are used in making the comparisons. In average annual pig iron production the United States increased from 2,284,000 tons in the 1871-5 period to 8,263,000 tons in the 1891-5 period. Since 1871 the British share in supplying the world with iron has shrunk from 46.3 per cent. to 37.5, while that of the United States has increased from 16.1 per cent. to 30.9. In the output of iron ore the British annual figure has declined in 1895 to 12,249,000 tons and that of the United States advanced to 14,288,000 tons. In the twenty-five years covered by the tables ending in 1895 the United States has increased its total in the world's yield of coal from 17 to nearly 30 per cent., while the British output fell off from 47 to 34 per cent. Great Britain's consumption of cotton in the same time has increased by a fourth and that of the United States has doubled.

The United States produces a fifth of the world's wheat supply, England and all its colonies one-eighth, and Germany one-twentieth. This country mines 22 per cent. of the gold of the world and 35 per cent. of the silver. In the twenty-five years the new railway constructed in the United States was twenty-three times as great as that of Great Britain and Ireland and nearly eight times as great as Germany's. While the total foreign trade of Great Britain, exports and imports, increased 21½ per cent., that of the United States increased 15. In the growth of population this country leads all others, with an advance of 24 per cent. in ten years. The British colonies and dependencies increased 12 per cent., Germany the same, Russia 11 per cent., Great Britain and Ireland 8.77 per cent. and France less than 1 per cent. It is of moment to remember that these are figures collected in Sweden, and that the comparison is made by a British official. The figures end with 1895. To bring them down to date would add to their significance.

**A French Opinion of American Machinery.**—"America has astonished the world with the accuracy of her implements and machinery; her steel ships resist and endure better than those of other and older countries. Her intricate machinery does not get out of order so quickly and stands crucial tests far beyond the power of European apparatus, and there are fewer failures, because there are fewer defects; this is due to her implements of precision."



### Amazing Growth of the Bicycle Industry in America.

IF ten years ago it had been predicted that before the close of the nineteenth century the manufacture of bicycles and bicycle supplies and of machinery for making them would constitute one of America's greatest industries, the prediction probably would have found few believers. Statements have been made from time to time concerning the bicycle's development in the United States, and comparisons, more or less accurate, have been made as to the skill and progress of wheelmakers in this and other countries. Englishmen have been pleased to assert that greater advancement in cycle construction has taken place in England than elsewhere. Frenchmen are disposed to think that the wheels made in France are as good as any others, and the efforts in Germany to encourage the use of home-built wheels rather than those made in America, by the proposed imposition of heavy duties on the latter, show that the superiority of Uncle Sam's machines is duly recognized by the Germans.

The remarkable growth during the last three years of the bicycle's popularity in countries where it was before almost a stranger offers new and great opportunities for manufacturers whose product is strictly first class and whose enterprise and genius are constantly alert. The exportation of wheels, as is shown by trustworthy statistics, has come to be an exceedingly important feature of the industry in America, and the foreign demand for American machines next year and thereafter is a matter of much consequence to the manufacturers of this country. The past has demonstrated that cyclists on the other side of the water are quick to appreciate the advantages of strong and speedy mounts. Whenever our manufacturers have made desirable changes in their models it has required only a very short time for foreigners to become aware of the fact and to make investigations regarding it.

At the present time cyclists in nearly every part of the world are eager to know what modifications or radical changes will be revealed in the American bicycles of 1899. It is doubtful if the manufacturers themselves could adequately answer the inquiry at this early date, as, very likely, many of them are not yet familiar with inventions and suggestions which they wish to consider carefully before deciding exactly how to fashion the new machines. Never before has the progressive wheelmaker had so great a number of practical and ingenious methods and devices to select from as he has now. Some idea of what inventors in this country have done within the last two years to increase the comfort and pleasure of wheelmen, and of what the latter may hope to enjoy before the close of another year, may be gained by examining the report of the Commissioner of Patents, at Washington, for the year 1897.

During that year the patents granted for inventions of bicycles, bicycle parts, appliances and devices number nearly eight hundred. Seventy-eight patents were issued for new bicycles, 49 for bicycle bells, 42 for bicycle brakes, 41 for bicycle tires, 33 for bicycle saddles, 30 for bicycle handle bars, 12 for bicycle handles, 15 for bicycle lamps, 14 for bicycle cyclometers, 13 for bicycle luggage and parcel carriers, 13 for bicycle wheels, 13 for bicycle frames, 12 for bicycle chains, 9 for bicycle pedals, 8 for bicycle gears, 7 for bicycle alarms and 5 for bicycle ball bearings. Other cycle patents were as follows: Supports, 61; stands, 17; locks, 31; canopies, 4; driving gear, 4; driving and propelling mechanism, 10; foot rests, 2; cranks, 3; crank hangers, 3; crank shafts, 2; attachments, 12, and chain brush, 1.

The above are only a few of the wheel inventions for which patents were granted. The complete list would occupy fully two columns. It appears to contain almost everything requisite for the wheelman's comfort and safety. Riders who care more for mild recreation than speed will find in the list many articles to please them, while the professional record-breaker should be able to choose a gear that will gladden his heart.

The figures of the Patent Office for 1897, when contrasted with the report of that office seven or eight years ago, are doubly interesting. In 1890 only 27 factories were engaged in cycle making, and less than 2,000 workmen were employed. The output was valued at a little over \$2,500,000. In 1895 the number of bicycle factories in this country exceeded 200, an aggregate capital of more than \$100,000,000 was invested, upward of 50,000 workmen were employed and at least 800,000 wheels were turned out. Last year the production of machines is estimated at considerably over 1,000,000. "In 1880," says the report, "a large proportion of the cycles used were imported, mainly from England. In 1897 the exports of cycles and parts of cycles to England amounted in value to \$2,128,491, and the total exports amounted to \$6,902,736."

But not only has the bicycle benefited Americans because of the investment of immense capital and the employment of thousands of workmen in

its manufacture. At the present time it is estimated that 2,000 shops in this country are engaged in the business of repairing bicycles; most of them also handle cycles and cycle supplies. In several of the shops from three to five repairmen are employed.

The manufacture of new machinery for use in making parts of bicycles and bicycle novelties has also given rise to an industry which furnishes employment to a very large number of Americans. Inventors have been busy day and night devising machines to facilitate the work of construction, with the result that the exportation of those products is exceedingly important by itself.

It is clear from the above, therefore, notwithstanding the numerous failures among bicycle concerns two years ago, the marked reduction in the price of wheels and the statements of uninformed persons that cycling has lost much of its charm, that the wheel occupies a very conspicuous place in the thoughts of the people, and when the figures showing the extent of the cycle industry for the present year are made known, that fact will probably be even more apparent than it is to-day.—*New York Sun*.

### American Manufactures in Germany.

OF all the products of American industry there are none, for the time being, of greater interest for the export trade than those of our manufactures of machinery. It is certain that the United States has outclassed, in this particular branch, all the other industrial nations, and this fact is acknowledged to-day even by persons who, upon the whole, do not evince much friendship for our country.

The city of Bamberg is not an important place for industrial enterprises. By far the greater part of products exported from there is not made in that town, but in the neighborhood. Notwithstanding this, American machinery has been very successfully introduced at Bamberg, and every week the local newspapers contain advertisements touching the sale of American agricultural and tool-making machines.

Only a few weeks ago a shipment of American machines to manufacture metal capsules for bottles (manufacturer, Bliss Company, Brooklyn) arrived there, and were not only entirely satisfactory to the purchasers, but exceeded their expectations. This is worthy of note, considering that only a short time ago capsules made in Germany were exported to the United States.

American machinery for the manufacture of shoes can be found in any German establishment of importance, and the United States electric machinery (Walker Company, Cleveland) used in the electric street railway of Bamberg is giving entire satisfaction. This is saying a good deal, considering that one of the largest works for electric engineering in Germany (Schuckert, at Nuremberg) is within close proximity.

It may also be mentioned that American watches have made their appearance in this market and are finding ready purchasers. The people speak highly of the neat workmanship which is characteristic of all American machinery.

### An English View of American Competition.

GREAT BRITAIN will have to make up its mind to see a good deal more of the American in our markets than has been the case hitherto. Trade is at present so good in the States that all the available productive power is required for home demands, but several manufacturer friends who have just returned from the States, where they have been on business, tell our Sheffield correspondent that the manufacturers there are so largely increasing their output that they will promptly overtake home requirements and enter vigorously upon European markets. "You will soon have us over amongst you," said one large producer to a Sheffield manufacturer, "and I will show you several of the lines in which we intend to do business." These lines included bright drawn steel and all the cheaper grades of steel, brass rods, files, small malleable iron castings, automatic machinery for all purposes, steam (india-rubber) hose piping and other goods. These were invariably from 25 per cent. to 50 per cent. cheaper than the prices quoted in this country.

It will not do to say that the quality is inferior, for at two establishments in Sheffield, where American articles are being used in increasingly large quantities, the workmen prefer both the raw steel and brass suitable for working in automatic machines, and also the files and the malleable iron castings. It is quite clear that American competition is going to be far more severe than it is at present.—Editorial in *The Hardware Trade Journal* (London).



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Best bargains offered  
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Spiral Screw Drivers.

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WE ARE THE WORLD'S HEADQUARTERS  
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Meat Tenderers.

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SEND TO ANY EXPORTER IN THE UNITED STATES, OR TO US  
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SPECIAL, GIVING NET PRICES.

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## Our Portable Pump

IN COMBINATION WITH

## THE GLOBE NEBULIZER

AFFORDS THE ONLY PRACTICAL  
TREATMENT FOR

All acute and chronic diseases of  
the nose, throat, ear, bronchial  
tubes, and lungs, including colds,  
catarrh, deafness, sore throat, hoarseness, diph-  
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whooping cough, pneumonia and consumption.

Suitable for both office and home use.  
Satisfaction Guaranteed.

THE GLOBE MANUFACTURING CO.,  
BATTLE CREEK, MICH., U. S. A.



*Temple*



Temple Scorchers. Discount to agents, 50 per cent. List price, \$75  
Temple Special. Discount to agents, 45 per cent. List price, \$60  
Temple Superb. Discount to agents, 40 per cent. List price, \$50  
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Best and cheapest line of Bicycles made in America.

Machines for Ladies the same price as for Men's.

Fitted with the best Saddles, Pedals and Tires.

Spanish Catalogues, and all letters written in Spanish.

TERMS: Cash in "New York" or "Chicago," to be paid us on delivery of complete  
shipping documents. Bicycles will be placed F. O. B. steamship at New York if  
desired, at no extra cost. "Send us sample order."

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## THE GLOVER PERFECTION.



Designed with special regard for  
conformation to the human body  
in the sitting posture. Recom-  
mended by physicians.

Flat Coil Steel Spring.  
No Rebound.  
No Pressure on Soft Parts.  
Cool. Comfortable.

RETAIL PRICE, \$3.50.

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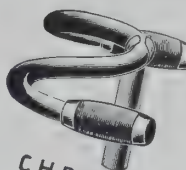


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## BICYCLE HANDLE BARS.

Best Nicked over Heavy Copper.  
Made 7-8 Tube Tops.

PRICES, WITHOUT GRIPS, F. O. B. NEWYORK.



C.H.B.CO.

Upturned, one doz. lots ..... \$10.50  
Drop, one doz. lots ..... 10.50  
Octagon Tube, extra, per doz. .... 3.00  
"Schinner" Bars, extra, per doz. .... 1.20  
One-inch Tube, extra, per doz. .... 1.20  
Ram's Horn, one doz. lots ..... 11.50  
Adjustable, one doz. lots ..... 13.50  
Anti-Vibration, extra, per doz. .... 3.00  
Seat Posts, per doz. .... 3.60

Any size stems. Discount to the trade on 100 to 50,000 lots.

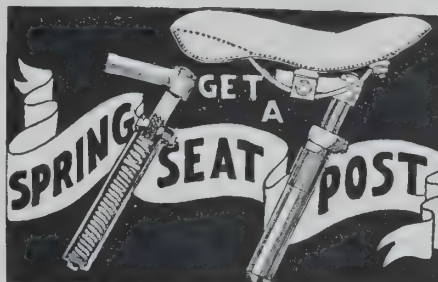


34 & 36 Market St.,

Chicago Handle-Bar Co., Chicago, Ill., U. S. A.

## BERKEY'S ADJUSTABLE SPRING SEAT POST

Solves the Problem.



No bicycle complete without it.  
It will prolong not only your own  
life, but life of your wheel. Lateral  
motion obviated by tightening  
screw. In ordering give exact size  
of seat post hole. Will fit any wheel  
and saddle. Send for circular and  
prices. In ordering through export  
commission houses send us dupli-  
cate order.

THE BERKEY

Akjustable Spring Seat Post Co.,  
GRAND RAPIDS, MICH., U. S. A.

## 2,000 '97 and '98 Model Bicycles

MUST BE CLOSED OUT  
REGARDLESS OF COST.

**\$13.00** and  
Upward.

Write for particulars.  
Most complete line in America.

In sending orders through export houses send us duplicate.

THE BROWN-LEWIS CYCLE CO., 300 Wabash Avenue,  
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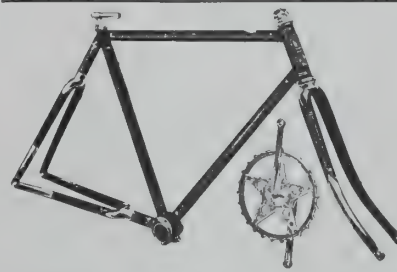


## No More Rust.

Our "Three in One" Lubricant  
Contains no Acid.  
Prevents Rust on All Metals.

The only perfect Lubricant for Bicycles, Guns, Sewing Machines,  
Reels, Etc. Never gums or hardens. For cleaning Bicycles or  
Fire Arms after shooting. It has no equal. It is transparent  
and clean to use. Correspondence solicited. Send for Catalogue  
"C." Order through Export Commission Houses in this country.  
Manufactured by

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"THE FINEST ON EARTH."

That's a broad claim to make for  
anything, but in the case of the

## MANSON 3 CROWN

MODEL 33

it's but the simple truth, and there is no  
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The Several Reasons Why?

It is made of the very best  
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It is new and novel and  
eminently practical.

It has two rear crowns to  
match the front fork  
crown, causing the ma-  
chine to be absolutely  
rigid.

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at the hanger which fa-  
cilitates the adjustment  
of the chain without  
using the rear chain ad-  
justers, and is fitted with  
the one-piece Fauber  
crank.

The Thor Hubs are used  
and recognized every-  
where to be the best.

The best swaged spokes,  
14x16 size, are used.

Laminated or one-piece  
selected rock-elm rims,  
1 1/2 or 1 3/4, 28-inch wheels,  
drilled 32x36.

The Peacock or Baldwin  
adjustable chain.

Head set, turned from bar  
steel, drop forging con-  
nections.

Seamless tubing through-  
out.

THE PRICES—\$75 less 33 1/3 and 5 per cent., delivered f. o. b. New York.

73-75 West Jackson St.,

MANSON CYCLE CO., Cable Address: "Manson."

Dunlap tires.

Steel adjustable handle  
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Record pedals.

Finest nickeling and enam-  
eling that can be put on  
a bicycle.

Frames, 22 and 24 in. high.

Weight complete, 24 lbs.

Choice of gear.

Ladies' frames are made  
same as gents, with ex-  
ceptions of drop bar and  
chain guards. Height,  
20 and 22 inches.

Chicago, Ill., U. S. A.



### Launch of the Admiral Dewey.

THE *Admiral Dewey* was launched at 2:40 on the afternoon of August 18th at Cramps' shipyards, in Philadelphia. The *Admiral Dewey* is the first of four merchant steamers building at Cramps' shipyard for the American Mail Steamship Company, to be named for distinguished admirals of the American Navy. They are to be operated in the trade between Boston, New York, and Philadelphia and Jamaica, British West Indies, and may be regarded as the pioneer vessels of the post-bellum development of American commerce. They will be run by the Boston Fruit Company, and will furnish weekly mail service to West Indian ports as far as Jamaica.

Hitherto the fleet operated by the Boston Fruit Company has been composed of entirely British-built vessels chartered for the trade. These vessels are about 1,500 tons register, while the new American ships will be of 2,000 tons register and will be of the highest rating in their class. They will also be much faster than the chartered British ships, and are constructed for use as auxiliary cruisers.

The construction of the *Admiral Dewey* has been a case of rapid work even for Cramps' shipyard, she having been launched from the same building slip that the battleship *Alabama* was launched from on May 18th last. The keel of the *Admiral Dewey* was laid one week from the launching of the United States battleship *Alabama*, so that the construction of her hull on the stocks has occupied two months and three weeks, an achievement of celerity in her construction hitherto unprecedented in the annals of American iron shipbuilding for a vessel of her size.

The principal dimensions of the four ships are as follows: Length, 280 feet; breadth, 36 feet; depth, 25 feet; tonnage, 2,000; speed, 15 knots. They are twin-screw ships, powered with vertical triple-expansion engines of the latest approved Cramp type, are provided with ample passenger accommodations, and are in all respects the most advanced type of vessels built for the West India trade of the United States.

### Furniture and Tills in South Africa.

SUPPOSING one goes into a friend's house in Cape Town, and he is asked to take a seat; well, a look at the chair naturally results, and being of a pattern and make new to the eye, a desire to know its origin brings out the fact that it is an American bentwood chair, or maybe it is of Austrian make. These can be bought retail from a half-crown upwards and are imported in large quantities, and, as they are made in loose parts which are put together with bolts and nuts, they solve the question of freight and cost, which militates against British furniture. Why can't our many chair manufacturers in Bucks and elsewhere have a share in this trade? They've got the wood, they've got the men and they've got the money, too! but evidently a poor stock of inventive enterprise. One sees but little substantially made furniture in Cape Town, as, being bulky, freights are prohibitive and the cheaply made light colonial furniture answers the purpose. American rattan cane furniture and Madeira wicker chairs are largely used, as they are light and portable for sitting on the balconies and stoops and they do not harbor insects as upholstered furniture does. In most of the refreshment bars about town one may see an elaborate nickel-plated American cash-registering till, while in the majority of tradesmen's offices can be seen an American roll-top desk and a typewriter.—Correspondent of *The Hardwareman*, London.

### The South Wales Coal Strike.

THE great coal strike in South Wales, which has now lasted 15 weeks, and which still presents no definite prospect of an early settlement, has hit the hardware trade in the southern portion of the Principality very hard. The retail traders in the colliery districts are, in common with most other shopkeepers, passing through a critical period, and should the dispute be left, as many fear it will, for the advent of Winter frosts to settle, many an unfortunate little trader will undoubtedly have to succumb to the unequal struggle. The hardship which this deplorable strike is occasioning is intensified by a feeling of irritation that it should have occurred at the opening of what promised to be one of the most prosperous of seasons for many years past. Cardiff, as the great outlet for the South Wales coal field, is suffering severely from the trade paralysis. A large section of the working class is dependent for subsistence upon public charity, building operations have received a great setback, and the wholesale trade in the supply of equipment for collieries and engineering works, which formed an important part of the large trade enjoyed by a few of the leading hardware establishments of the

Welsh metropolis, has practically altogether closed. The takings of the smaller shopkeepers situated in the great working-class districts around the centre of the town have been reduced in many cases to something like half, and outstanding accounts go to swell a gradual but ever-increasing indebtedness. Altogether, the trade outlook in South Wales is of the gloomiest character, and the slightest ray of hope is being eagerly, if somewhat despondently, watched for. The Government Conciliator has arrived and is getting to work, but his movements are regarded rather with skeptical curiosity than with sanguine expectancy, the general impression being that the final settlement will be rather in the nature of surrender from starvation than of compromise—the result of prudence and reason.—*The Hardwareman*—London.

### American Blotting Paper.

HALF a century ago very few people used blotting paper, and what was used was imported. Black sand was in almost universal use in counting houses. In fact, there was somehow a disposition to ignore blotting paper, as too plebeian or un-English. The first blotting paper made in the United States was the product of the mills owned by Joseph Parker, afterward of the firm of Joseph Parker & Son, New Haven, Conn., in 1856. It was made of cotton waste, and when compared with the English product was declared to be superior. Up to the sixties the demand for blotting paper was small, but its use has so increased that the old sandbox has long since "gone by the board," and the product now in the United States is about 100,000 pounds per day. It is very extensively used for advertising purposes by corporations and large companies. There are now a great number of mills that make blotting paper, and the product is of a varying quality. What is needed most in blotting paper is a good absorbent without regard to color or weight. While the most of the American product is consumed here, not a little is finding its way to foreign countries, where it is highly appreciated as superior at least to all Continental makes.

### Exports of American Typewriting Machines.

THE exports of typewriting machines from this country increased by nearly \$500,000 in 1898 over the figures for 1897. The values for the two years were \$1,453,117 and \$1,902,153 respectively. Among the chief countries to which they were sent were the following:

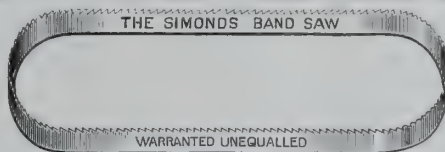
	1897.	1898.
United Kingdom .....	\$731,152	\$896,576
Germany.....	228,710	425,614
France.....	99,222	94,608
Other Europe.....	175,976	232,253
British Australasia.....	67,622	60,039
British North America.....	30,710	51,752
Africa.....	19,622	36,342
Mexico.....	25,298	28,900
Argentina.....	11,914	18,187

**American Trade with Japan.**—British consular reports say America's trade with Japan for 1897 shows an enormous increase. Imports into Japan from the United States increased 57 per cent., and exports increased 55 per cent., while foreign trade with Great Britain only 5 per cent., and with Germany 8 per cent of the total. The following comparison is made in iron and steel products of the years 1890, 1896 and 1897:

Locomotives.....	\$48,518	\$416,106	\$2,393,385
Machinery and instruments.....	394,111	781,510	1,909,723
Steam boilers.....	30,314	54,869	211,790
Rails and railway materials.....	619	434,853	1,558,794
Iron nails (lbs.).....	1,298	232,353	939,379

**American Manufactured Woods in Great Britain.**—The *London Timber Trades Journal* says the growth of the importation of manufactured wood goods from the United States into Great Britain is somewhat startling. In 1893 we sent them goods in this line to the amount of £193,000. In 1897 the amount was £430,000, or more than double the amount of 1893. Continuing, the *Journal* says: "This extraordinary total included a great variety of manufactured goods in addition to what we usually designate as joinery, and probably included the multifarious wood exports of our American cousins—from meat skewers, toothpicks and clothespegs, to roll-top desks and drawing room suites. That the export of pine doors, however, is a rapidly increasing trade is apparent even to the casual observer, and arrivals of these goods may be counted by hundreds of thousands.



**SAWS.****Machine Knives.****SIMONDS M'F'G COMPANY,**

FITCHBURG, MASS. U. S. A.

ADVANCE ANNOUNCEMENT FOR 1899.

**OUR NEW GAS LAMPS****FOR BICYCLES AND CARRIAGES**

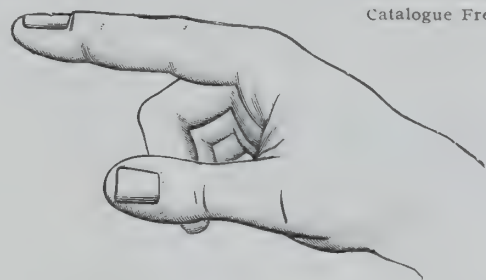
will be ready for delivery December 1st, 1898.

Powerful Light.  
No Oil or Smoke.  
Symmetry of Design.  
Absolute Safety.  
Simplicity of Construction.

MADE BY

**The E. P. Breckenridge Co.,**

TOLEDO, OHIO, U. S. A.

Send for Latest  
Catalogue Free.**FOREHAND ARMS CO.,**

WORCESTER, MASS., U. S. A.

Manufacturers of High-Grade

**Revolvers and Shot Guns**

At Moderate Prices, for Export.

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Retail Price,  
**\$5.00**Retail Price,  
**\$7.00****JAMES HILL MFG. CO.**

PROVIDENCE, R. I., U. S. A.

Manufacturers  
of

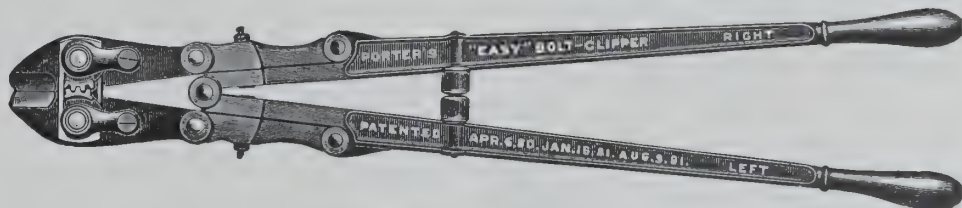
Write for Catalogues "O" and "P."

Roving Cans, viz.: Vulcan Fibre, Hill's IXXX Tin and  
all kinds of Mill Boxes and Cans.  
Also Galvanized Sheet Iron Goods, Ash and Garbage  
Cans, Fire Pails and Buckets, etc.  
For sale through commission houses or direct.

THE  
**"Easy" Bolt Clipper**

**IS THE BEST.**

MANUFACTURED BY

**H. K. PORTER, 66 Beverly Street, BOSTON, Mass., U. S. A.****ATLANTIC VARNISH WORKS,****VARNISHES ESPECIALLY  
FOR EXPORT.**Also Manufacturers of **FIRE-PREVENTING PAINTS AND KALSOMINE,**

As cheap as ordinary paint with this valuable fire-preventing property.

For Varnishes address ATLANTIC VARNISH WORKS, Richmond, Va., U. S. A.

For Paints address E. T. D. MYERS, Jr., Gen'l Sales Agent, Richmond, Va., U. S. A.



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**Shoe Polishers AND Daubers.**

We make a large line of **WOOL POLISHERS** for russet shoes,  
and **IRON-HANDLED DAUBERS** for black shoes.

WRITE FOR PRICE LIST B.

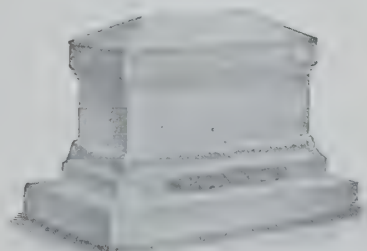
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All our work guaranteed strictly first-class and according to contract.

FACILITIES: The most improved machinery, artistic designers, skilled workmen.

Orders filled through commission houses.

**THOMAS & MILLER, Quincy, Mass., U. S. A.**

Trade-Mark.

Massachusetts Brand.

**SOLID BRAIDED CORDAGE.**

Sash Cord,  
Clothes Lines,  
Railroad Cords,  
Are Light Cord,  
Lariats, Etc.



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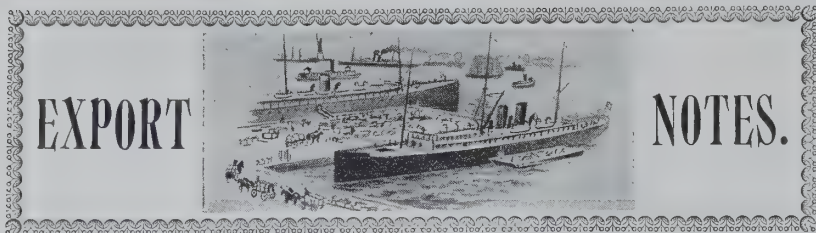
Awning Lines,  
Mason's Lines,  
Chalk Lines,  
Curtain Cord,  
Shade Line, Etc.



SAMSON BRAND

**SAMSON CORDAGE WORKS, - - Boston, Mass., U. S. A.**





News of Notable Export Contracts, Sales and Shipments.

Bement, Miles & Co. have just booked some large foreign orders for machine tools, among them eight gun lathes for England, some large tools for Russia, and large boring mills, planers and lathes for different foreign points.

There is now a considerable export trade in pianos and organs. The Weaver Organ and Piano Company, of York, Pa., states that its firm has already shipped 600 organs into New Zealand alone, and shipments are being made also to Mexico.

The British steamer *Cape Comino* cleared from Philadelphia for Odessa, Russia, recently, loaded with about 3,100 tons of cast-iron pipe and fittings valued at \$35,800. They are for the Russian Government, and are to be used for conveying oil in the petroleum fields. The shipment was made by R. D. Wood & Co., of Philadelphia.

The Baldwin Locomotive Works have just shipped forty locomotives for the Chinese Eastern Railway. Only a short time ago twelve such machines were sent, and there are under construction at present for the same road twenty-five more locomotives. The same works will have ready for shipment shortly ten locomotives for New Zealand.

The imports of American steel to Great Britain in July were the largest in value of any month during the present year, aggregating, according to the British Board of Trade returns, 2,842 tons, worth £14,046. This gives a total for the seven months of 25,927 tons, worth £128,892. In pig iron the seven months' totals are 91,196 tons, valued at £209,275.

During the past few weeks the Denver Engineering Works have shipped seven carloads of electric hoists to Mexico and several hoists to Cripple Creek. The inauguration of such power plants will probably create a demand for this class of machinery, and it is anticipated that the power companies will inaugurate a system of renting hoists in connection with the power.

The Whitin Machine Works, of Whitinsville, Mass., are manufacturing some machinery for a large cotton mill in Russia. English machinery was earlier in use. A few months ago a trial order was placed with the Whitin Company for one spinning frame and ten looms. The receipt of this machinery led to a very much larger contract being secured by the Massachusetts firm and the shipments will soon begin.

The narrow-gauge railroad connecting Wangaratta and Whitefield, Australia, has accepted an American bid to furnish two sample locomotives, from which it is expected that any future engines to be built for the road in the colony will be imitated. The American bid was about \$18,000—\$1,500 below the lowest other offer—and the time required for completion was seventeen weeks in this country as compared with fifteen months in England.

Our export trade in candles, while not representing a very large amount in value, some \$232,000 during the fiscal year ending June 30, 1898, shows a considerable quantity—3,072,369 pounds. There was an increase of rather more than 400,000 pounds in the quantity of American candles exported this year, as compared with 1897. At the same time there was a gain of nearly 5,000,000 pounds in the shipments of soap that we made to foreign countries.

The Carnegie Steel Company has received a contract for 30,000 tons of 2½-inch billets for the English market. The billets are probably for use in the manufacture of bolts. The company has also an order for 10,000 tons of plates for the City Water Works of Sydney, Australia. The Carnegie Company has also made an initial shipment of steel rails on a large contract received from Bluefields, Nicaragua. The cargo left Baltimore a few days ago. It comprised about 500 tons of 80-pound rails.

An evidence of the rapidly increasing importance of the trans-Atlantic carrying trade of this country is shown in the extensive increase of its fleet now being carried out by the Holland-America Line. The first of the new fleet made its maiden trip last month and was inspected by many representatives of the press and others while at her dock at the foot of Fifth street, Hoboken. This vessel, named the *Statendam*, is a fine twin-screw steamship of 10,500 tons. Her passenger accommodations are unusually handsome and tasteful. Three other twin-screw steamers are now building, the *Potsdam*, *Ryndam* and *Noordam*, all of 12,500 tons. As this line runs direct from New

York to Rotterdam, touching at Boulogne, it offers an exceptionally good route to Northern Europe.

The machinery of the Brown Hoisting and Conveying Machine Company, of Cleveland, is now seeking a market in Europe. Already three bridge tramways have been placed at the Krupp works at Rheinhausen; two with the Krainische Industrie Gesellschaft in Trieste; two are in operation at the new works of La Société Providence, Mariopol, Russia. Two bridges have just arrived in South Russia, and within a few weeks orders for eight additional bridges have been received from other European points.

A representative of the Lorain Steel Company, of Lorain, Ohio, U. S. A., is quoted in a newspaper interview as follows: "We are shipping steel rails to many parts of the world, and every year witnesses an extension of the export business. It is a fact not generally known, I think, and interesting, too, in my estimation, that we are shipping steel rails to Manaos in Brazil, 1,000 miles up the Amazon River from its mouth. We are shipping rails to other parts of South America and to points in the United Kingdom."

Fresh offers for the supply of 1,000 tons of cast-iron pipes were opened by the Glasgow Water Committee at a meeting held recently. It was stated that a Philadelphia firm was the lowest, and that a British firm came next, the total difference in the price being £66. The committee was pretty equally divided as to which firm should receive the contract, the American finding several supporters, and ultimately it was agreed to remit the matter to the works committee for consideration.—*London Iron and Trade Review*.

What is said to be one of the largest orders in school slates received in the city of New York for export has just been booked by James S. Barron & Co. The order calls for 2,000 cases "D" Lehigh school slates for the Australian market. This represents ten carloads of slates. Recently some good-sized orders have been received in this market for school slates from Argentina, and there are at present indications of business in this direction being done with certain European countries, to which quotations have been furnished for large lots of school slates.

American agricultural machinery has become very popular with the people of South Africa, and the five years just ended show a very satisfactory increase of this business there. American harvesters and reapers are coming into general use, and while a few years ago we only sold to that market the cheaper and heavier classes of implements, to-day we are introducing our higher-priced and better grades of goods very successfully; so much so that the British manufacturer, who formerly had control of this market, is feeling the effect of our competition very keenly.

The Putnam Machine Company, of Fitchburg, Mass., is making a heavy shipment of machinery to the Sandwich Islands. They are equipping an entire plant for manufacturing sugar mill machinery, and their shipment consists of a massive 500-horse-power engine and a full equipment of iron-working machinery, consisting of heavy massive lathes, drills and other machinery for making a perfect equipment of the plant. This is the second shipment the company have made to the Sandwich Islands during the past six weeks, and completes the machinery for the plant.

The Union Bridge Company has recently shipped to South Africa, for the Orange Free State Railways, a bridge, the building of which involved some novel conditions. It is made up of two deck spans of 100 feet each. The trusses are latticed girders 8 feet 10 inches over all deep, 7 feet 8 inches panel length and 10 feet wide centre to centre of trusses. The bridge is to be erected where false work cannot be used. Therefore, arrangements were made for erecting both spans on shore and running them out on rollers. The Union Bridge Company furnishes the rollers also, and one condition of the order was that both spans should be erected complete in the shops and the action of the rollers tested by actually running out the spans as is to be done finally on the ground.

**American Tools at the Cape of Good Hope.**—My experience in these convinces me that in saws, braces, chisels, auger bits, axes, the American takes the lead, not only in price, but in quality and finish; but of late years the British makers have followed our American cousins, and are now following in their footsteps, and regaining some of the trade in these lines. In packing the goods above mentioned the Americans commenced packing tools in neat cardboard boxes, making them handier for stowage on shelves and also more attractive to the eye. In chisels, the Americans send them out all ready for work, ground and sharpened, while the English chisels and gouges have to be sharpened after purchase. This idea is now being followed by the British.—*Colonial Governor's Report*.



**TRENTON WATCHES and CYCLOMETERS**

give universal satisfaction. Various sizes and grades of watch movements and complete watches, with cases of numerous characters, and several styles of Cyclometers, suit all requirements. Prices to the trade upon application.

Duplicates of orders given commission houses should be sent direct to factory.



**TRENTON WATCH CO., Trenton, N. J., U. S. A.**

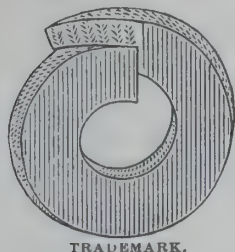


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**The Original Fireproofing and Waterproof Paint.**

When combined with cold water makes the finest paint on earth. Especially adapted for out-buildings, private residences, factories, breweries, tanneries, stables, fences and cellars. Its fireproofing and waterproof qualities make it especially valuable for manufacturing establishments and large buildings of every description. Comes in powder form, in white and colors. Orders filled through commission houses. Send for color card, free sample and catalogue "1." Goods sold under absolute guarantee not to peel, crack or wash off. In ordering specify whether wanted for inside or outside use.

**ALDEN SPEARE'S SONS & CO., No. 369 Atlantic Avenue Boston, Mass., U. S. A.**



TRADEMARK.

**COULD'S STEAM AND WATER PACKING.**

Patented June 1, 1880.—The Original Ring Packing.

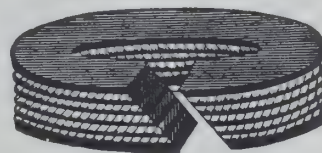
IN ORDERING, GIVE EXACT DIAMETER OF STUFFING BOX AND PISTON ROD OR VALVE STEM.  
**SELF-LUBRICATING, STEAM AND WATER TIGHT.**

Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. EVERY PACKING FULLY WARRANTED.

N. B.—This packing will be sent to any address, and if not satisfactory after a trial of 30 days, can be returned at our expense. None genuine without this trademark and date of patent stamped on wrapper. All similar packings are imitations and calculated to deceive.

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ORIGINAL RING PACKING.



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**Translation Bureau of "THE AMERICAN EXPORTER"**

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Will furnish upon application, estimates for the translation and the printing of books, catalogues, circulars, letters, etc., in Spanish, French and Portuguese.

Pat. C. E. D. Heel Shave.

Made in 16 sizes.



Orders filled through commission houses.

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MANUFACTURERS OF

Edge Planes, Heel Shaves,  
Welt Trimmers, Burnishing Irons,  
Edge Setter Irons, Breasting Knives.  
Knives for Machines made to order.

**FINE SHOE TOOLS**

FOR EXPORT TRADE.

Patented  
Jan. 8, 1895.



**THE WIRE FLY KILLER.**

UNIVERSALLY USED ALL  
OVER THE WORLD.

Unsurpassed in houses, Stores, Etc. Does not crush the fly.  
Does not soil the most delicate wall paper or ceiling.

Orders filled through Commission House.

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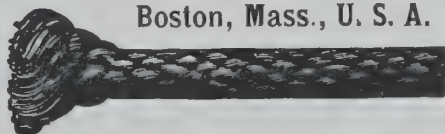
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**SILVER LAKE COMPANY,** THE ORIGINAL MANUFACTURERS OF

WINDOW SASH CORD, { COTTON, LINEN OR  
RAILROAD BELL CORD, { ITALIAN HEMP.  
ARC LIGHT AND TROLLEY CORD.

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**Solid Braided Cordage.**

THE BEST IS THE CHEAPEST.

CLOTHES LINES,  
AWNING AND MASONS' LINES,  
CHALK LINES, ETC., ETC.

Send for Samples.

STEAM PACKINGS. SILVER LAKE & MILLER SOAPSTONE PACKING.

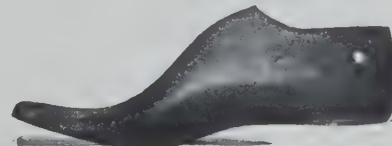
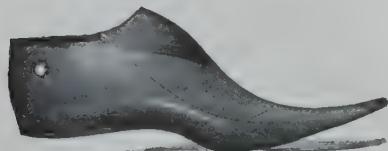
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Manufacturers and Exporters of a

Full Line of Men's, Women's and Children's **LASTS.**

Orders filled through Commission Houses.

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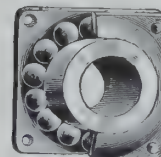
ERIE, PA., U. S. A.

Manufacturers of a Full Line of

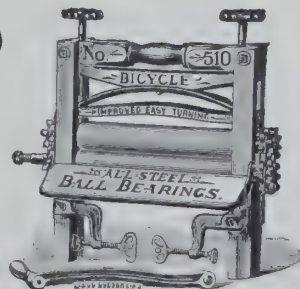
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Send for Catalogue.  
Special attention given to export orders.  
Correspondence solicited in any language.



SECTIONAL BEARING.



**SPECIAL HIGH-GRADE ROLLS.**







*Devoted to the Foreign Trade in Electrical Appliances.*

### Electricity in Iron and Steel Plants.

THE introduction of electricity as a motive power in the manufacture of iron and steel has already passed the experimental stage, and become one of the economies of production. In contrast with the cost of steam power—under favorable conditions, the figures are in favor of electricity. Under the old régime, where boilers and engines were more or less scattered in large plants, a waste of power on a large scale was, in a measure, unavoidable. This, with related extras in cost, was an item not to be overlooked in these days of close competition. The result has been a practical test of the new motive power and the establishment of its claims of efficiency and economy. In nearly every class of industry where motive power is required electricity has made its way. In the machine shop, the foundry, the factory and the coal mine; in driving tools and running lathes, and in the working of cranes, etc., the noiseless and invisible hand that lights our streets and operates their railroads is busy and dominant. That the rolling mill should escape its sovereignty was not to be expected. The importance of our iron and steel industries, and their vital connection with the prosperity of the entire country, makes every possible economy in their operation a matter of absolute necessity. In a paper prepared by Eugene B. Clark, of the Illinois Steel Company, for the Western Society of Engineers, the following is in substance said:

"The conditions existing in a large rolling mill are particularly advantageous to the use of electric power for operating many of the auxiliary machines which are scattered in such a plant. The large area, compared with the average manufacturing plant, which is covered by a steel mill, necessitates either a large number of small steam units or else a large amount of piping. The economy of either method is so low as to be prohibitive in many cases, consequently the outlying machines must be brought into a smaller radius at the sacrifice of convenience or economy of operation, or a cheaper method of transmission must be adopted. Pneumatic or hydraulic transmission have each their peculiar field in which each has its special advantages, but where the field of each has been covered there still remains a large number of places in which power can be conveyed more cheaply and conveniently by electric than by any other means."

This conclusion is not a matter of speculation but of practical tests. The details of application as covered by the paper quoted, include the lighting of mills, the use of motors on travelling cranes, electric hoists, conveyors, table rolls and charging and drawing machines. Also motors to drive lathes, shears, pump drills, punchers, crushers and pans, and others that operate grinding machines, etc.

It is to be noted that as coincident with the adoption of electric power by American iron masters that the example is being followed in Great Britain, where any innovation of this kind is always received with more or less incredulity and never adopted without investigation and caution. The same may be said of other countries, and it seems to be but a question of time when, electricity as a motive power, will count as a prime factor in the economics and management of all iron and steel plants.

### The Machinery for the London Underground Railway.

THE machinery for the Metropolitan Electric Supply Company of London, England, is nearly ready for shipment. The machinery includes three 2,500 horse-power engines, the largest built over here, and direct-connected generators, each having a nominal output of 2,000 horse-power, with 500 volt, two-phase current. This is a noteworthy order, and the appearance of the work justifies the expectation that more American machinery will follow this to the other side of the water. The engines and generators are mounted on separate bed plates, and the exciters are connected direct to the engine shafts.

The engines are the largest of their type ever built. They are compounds, with cylinders 36 and 55 by 36 inches, and are of the inclosed vertical marine type. The steam pressure may be as high as 200 pounds, though they are designed to give the best results at a pressure of 140 pounds and a speed

of 120 revolutions per minute. When exhausting into the atmosphere at 133 revolutions per minute and under 100 pounds pressure the engines develop 2,500 horse-power, while at 120 revolutions and 140 pounds pressure they will develop 3,500 horse-power at a maximum. The bed plates are of the box form for mounting upon concrete foundations. The crank shaft is extended at one end to an outboard bearing to provide for the generator. The crank shaft is of forged steel, 14 inches in diameter, and it is enlarged at the armature to 20 inches. The piston rods are 8 inches in diameter. The weight of the outboard bearing is about 20,000 pounds, while the combined weight of one generating set is about 435 tons, the engine weighing about 210 tons. The engine is about 20 feet high. The lubrication is carefully attended to, and so is the adjustment of the main bearings to take up wear. These bearings are in four adjustable sections, the lower one being cased for cooling water. The main bearings are 28 inches long, and throughout the design it is made evident that the engines are to be run for long periods without stopping. Piston valves are used, that for the high-pressure cylinder being double-ported and the pair for the low-pressure cylinder being single-ported.

The fields of the generators, part of which are on their way to England, have 62 pole pieces of laminated steel plates, the frame being in two parts split vertically, so as to be separated along the axis of the generator for easy access to the armature. The field-coil winding is on copper strips placed on edge. For ease in shipment and in handling, the armature spider was cast in halves. The armature winding is in rectangular copper bars in the slots of the punched armature rings, and the ventilation of the armature is excellent. The direct current exciters are mounted on the ends of the armature shafts outside of the outboard bearings.

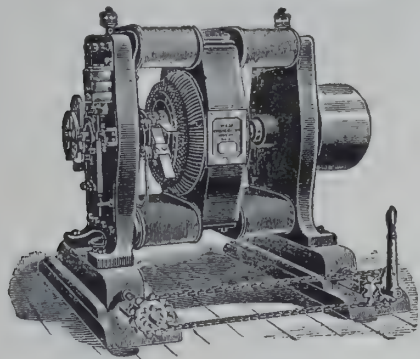
### Inclined Elevator.

AMONG the recent applications of electric motors is one to an inclined elevator, which has been installed in a New York department store. The inclined elevator is a compromise between a common stairway and a vertical elevator. It consists, practically, of a moving band, to which are attached a number of hardwood slats, which are ridged with rubber. These give a comfortable footing for the passengers, who step on the moving band at the bottom of the staircase and are carried up to the landing. On arriving at this point, the stepping off is perfectly easy, and absolutely safe. When fully loaded the elevator carries thirty-seven people in one minute, or 2,220 in one hour. The hand rail moves along at the same rate as the chain on which the passenger stands, and as the machinery runs quite noiselessly, it has been found necessary to call attention to the fact by molding into the face of the rubber rail large round white disks. This elevator takes up very little space, and can be located adjacent to a wall; it fulfills the fire department regulations as to a stairway, and thus does away with the stairs needed in addition to an ordinary elevator. It is safe and noiseless; it requires no attendant to run it; it may be started or stopped at either end by pressing a button; it is always ready for use, and consumes power only in proportion to the number of passengers elevated. It is further claimed that the passenger on the inclined elevator cannot possibly have the unpleasant and distressing experience to which many people are prone when suddenly ascending or descending in a rapidly moving vertical elevator.

### Elevators That Are Safe.

THE question of safety devices for the elevators of the new Empire Building, just completed in New York, has been settled by the application of air cushions to the ten passenger elevators. Each shaft is walled up independently as high as the third floor, and is made a close fit for the car, and the last fifty feet of the drop of each elevator is, therefore, in the air cushion. The elevator cars may fall into their cushions, whereupon the air is confined in the bottom of the shaft, and, by its gradual escape, lets the elevator down easily without shock. It is stated that a car has been dropped from the twentieth floor of this building without breaking eggs and incandescent electric lamps that were placed on the floor of the car. The pressure of the air caused by a fall from the top floor, a height of 290 feet, is calculated to be about  $3\frac{1}{2}$  pounds. The estimated proportion between the length of the cushion and the length of the drop is as one is to six. The advantages of this safety device are: Simplicity, reliability, absence of moving parts and the sacrifice of no room that could be used for any other purpose. The only precaution necessary seems to be to make the doors of the lower floor entrances air tight, and this is easy.





## FORT WAYNE ELECTRIC CORPORATION,

Foreign Dept.: 115 Broadway, New York, U. S. A.

Factory: Fort Wayne, Ind., U. S. A.

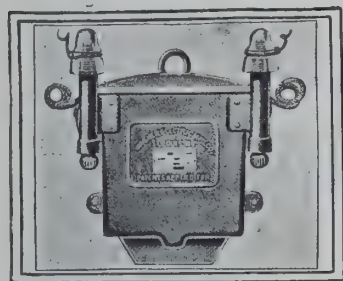
MANUFACTURERS OF

## Electric Lighting and Power Apparatus,

### "WOOD" SYSTEMS

Of Arc, Direct Current and Alternating Incandescent Lighting, and Power Transmission.

Estimates furnished on receipt of specifications.



We have courted and ENCOURAGED

COMPARATIVE TESTS, knowing that our Competitors alone had cause to fear them.

REMEMBER, EFFICIENCY AFFECTS YOUR COAL PILE

The Cheapest Transformer is sure to prove the most expensive in the end

**WAGNER ELECTRIC MANUFACTURING CO**

GENERAL OFFICES AND FACTORY, ST. LOUIS, U.S.A.

WHEN WRITING US MENTION "THE AMERICAN EXPORTER"

## SELF-LUBRICATING MOTOR AND GENERATOR BRUSHES

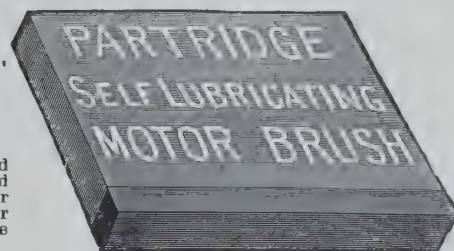
Manufactured by

The Partridge Carbon Co.

Office and Factory,

SANDUSKY, OHIO, U. S. A.

These Carbons are for Generators and Motors of all kinds. Specially adapted for Fan Motors and Electric Street Car Work. In ordering through supply or commission houses send us duplicate order.



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AGENTS ALL OVER THE WORLD.

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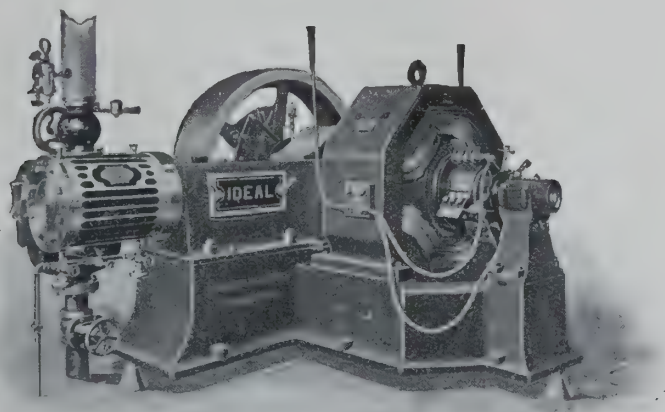
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ALTERNATING CURRENT,  
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Electric Plants for Hospitals and Asylums.

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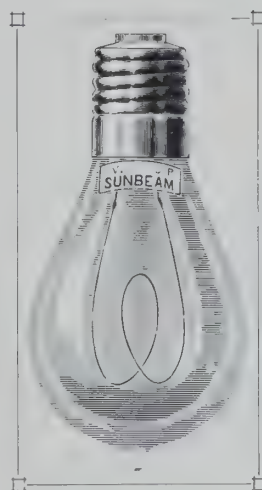
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## SUNBEAM INCANDESCENT LAMPS.



The quality of incandescent lamps is determined not alone by the amount of light given, but also by the amount of energy consumed. Under the same circumstances the **SUNBEAM** will be found to give more light at the same expenditure of electrical energy than any other lamp. It will also have a longer life. The peculiar construction of our filament enables us also to furnish lamps which are superior to all others in maintenance of candle-power.

WE CAN FURNISH

Lamps of All Voltages and Candle Powers.

SPECIAL PRICES FOR EXPORT.

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No. 57 Bethune Street,  
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Chicago, Ills.



## LATEST CATALOGUES.

*These catalogues may be had free of charge on application to the firms issuing them.  
Please mention THE AMERICAN EXPORTER when you write.*

THE F. M. DAVIS IRON WORKS CO., Denver, Col., U. S. A. Catalogue of mining machinery, concentration and reduction machinery, quarry machinery, and smelting furnaces. 100 pages.

H. G. SHELDON, Fremont, Ohio, U. S. A. 1898 illustrated catalogue of drop-forged carriage hardware. Includes shifting rails, back irons, shaft eyes, pole eyes, etc., etc.; also steps, patent fifth wheels and the like. All illustrations numbered, making a useful index of parts.

THE JEFFREY MFG. CO., Columbus, Ohio, U. S. A., have sent us a copy of their catalogue No. 48, of elevator buckets and spiral conveyors, chain belting, elevating, conveying and power-transmission machinery, together with a special supplement in Spanish, to which they call particular attention.

FRANKLIN TYPEWRITER COMPANY, 320 Broadway, New York, U. S. A. Small descriptive catalogue of the "Franklin" typewriter explaining and illustrating its distinctive features. Also book of instructions which contains among other matters of interest and value a very useful set of numbered illustrations of the various parts of the machine that should be of interest to dealers.

ROYAL WORCESTER CORSET COMPANY, Worcester, Mass., U. S. A. Elaborately illustrated catalogue of the "Royal Worcester" corsets, showing not only many of the most representative and successful models, but the manufactory where they are made in all its departments. An exceedingly interesting and valuable book for all who are interested in this line, as well as a work of art in itself.

COMSTOCK MANUFACTURING CO., Kalamazoo, Mich., U. S. A. 1898 catalogue of "Climax" high-speed, self-contained, centre-crank, automatic engines, both horizontal and vertical; also marine engines, tubular boilers, boiler-feed pumps, etc. Several pages are devoted to descriptions of hangers, pillow blocks, couplings, shafting, governors and power-transmitting machinery. Illustrated.

THE GEO. L. SQUIER MANUFACTURING COMPANY, Buffalo, N. Y., U. S. A., have just sent us a very handsomely illustrated supplement to their catalogue of coffee machinery. The latest additions to their supplement include a complete line of coffee pulpers, coffee dryers, coffee hullers, coffee polishers, etc. Prices are given as are also the weights of the various machines, measurements when packed, code word, etc.

G. W. COLE & CO., 111 Broadway, New York, U. S. A. 1898 catalogue of bicycle specialties, including their well-known "3 in One," lubricant, cleaner and rust preventive, "Pace-Maker" gear lubricant, "R. R." rust remover, etc.; also various styles of holders, coasters, parcel carriers, toe clips, bicycle stands and similar supplies. The catalogue also describes a great variety of models of bicycle saddles and tool bags. Illustrated.

RELIABLE INCUBATOR AND BROODER CO., Quincy, Ill., U. S. A. Catalogue of incubators, brooding houses, egg cabinets, poultry-house heaters, etc.; also every possible variety of poultry-raisers' supplies, such as metallic feed troughs, drinking fountains, food and bone cutters, poultry netting, insect powders, poultry foods, etc., etc.; also price list of thoroughbred stock and eggs. Contains a great deal of miscellaneous matter of interest to poultry raisers. 224 pages. Fully illustrated.

**American Street Cars in Manila.**—American street cars are used in Manila, and when Admiral Dewey and General Merritt and their men have occasion to ride in that city they must feel "at home." The entire equipment of the "Tranvias de Filipinas" was furnished by Messrs. J. G. Brill Company, of Philadelphia. These cars number about 25 and seat 20 passengers. They weigh less than 2,700 pounds each, which is very light considering their carrying capacity. They are hauled by horses not much larger than Newfoundland dogs. The gauge of the road is 3 feet 6 inches, the width of the cars being 5 feet 6 inches and the length 17 feet 6 inches. The closed cars have  $2\frac{1}{4}$ -inch steel axles,  $2\frac{1}{8}$ -inch journals.

### To Make Needles by Machinery.

AN American company is about to be incorporated with a capital of probably \$2,000,000, for the purpose of engaging in the manufacture of sewing needles with machinery that has just been invented and patented. The perfected invention is a result of four or five years of labor. An exhibition was arranged to take place near Pittsburg a short time ago, to which mechanical experts were summoned from Chicago, New York and Boston. With only a small force of operatives, a working model of the machine was tested. It turned out in four hours steady running, 50,000 needles, about 98 per cent. of which were perfect. It is claimed by some of those interested that the machine proper can produce 1,000,000 needles daily, with the assistance of 125 operatives, a result which could hardly be accomplished by ten times that number of men in a European needle-making plant.

This machine is necessarily of very intricate construction, since it attends to some twenty different processes of manufacture, receiving the crude steel wire at one end and turning out a needle, almost completed, at the other end. Nothing remains to be done to finish the needle except temper it and stick it into its paper receptacle. The tempering is always done with bunches of needles, with probably 1000 in a bunch. Machinery—also the invention of the getter-up of this machine, and now earning him royalties in every needle factory in England and Germany—next takes the needles and sticks them in paper.

**Lightning Street Cleaning.**—Pneumatic street-cleaning machines have been in use in Indianapolis for several years. It has been found that one machine with a driver, an operator and one or two wagons to haul away the sweepings can clean six miles of street in ten hours. One particular advantage in the system is the fact that it can be used in cold weather when sprinkling is impracticable.

**A Funeral Car.**—The Philadelphia and Reading Railway Company has nearly completed the construction of its first funeral car at its shops in Reading, Pa. This novel car, which is designed to supply an already existing demand, is about the same size as an ordinary travelling coach, and has separate compartments for the funeral casket, the family and the mourners. Its seating capacity is eighty. It is handsomely upholstered in dark-gray plush.

**Metal Trade with South Africa.**—The quantity of structural material which is being bought for the South African market at present is unusually large. Metal ceiling is meeting with much demand also, while transactions in machinery for the South African market increase daily. Extensive shipments have also been made of late in car material. Upward of £4,400 worth of harvesting machinery has been shipped to South Africa recently. In contractors' supplies several good-sized orders are about to be placed by merchants, which include such items as road scrapers, wheelbarrows, shovels, picks, etc.

**The World's Greatest Railway Builders.**—The world's progression in railways during the past thirty years has been simply wonderful. During the twenty-five years between 1870 and 1895 there has been an increase in the length of railways in Great Britain and Ireland of 9,000 kilometers; Russia has increased her lines to the extent of 24,500 kilometers; Germany by 27,624 kilometers; France by 22,486; while here in the United States we have added 207,000 kilometers, or nearly eight times as much as Germany, twenty-three times more than Great Britain and over twice as much as all the countries named put together.

**Shipping Molten Iron.**—Shipping molten iron by rail is a daily stroke of economy to be witnessed at Duquesne, Pa. The molten iron as it is tapped from the furnaces runs into an immense mixing ladle having a capacity of 250 tons, and from this it is poured into the 20-ton ladle cars, the ladles being made of sheet steel or iron, with a lining of refractory material. The cars are then hauled by a locomotive to the steel works, where the direct conversion of the molten iron into open-hearth steel is made, avoiding all the expense of casting the metal into pigs and cooling, handling, reloading, reheating and remelting the pig metal. It is stated that between 700 and 800 tons of iron will be transported daily from the Duquesne furnaces in this manner, and that with the completion of the Union Railroad bridge across the Monongahela hot metal will be shipped from the Edgar Thompson furnaces to Homestead.



## AMERICAN WOOD-WORKING MACHINE CO

SUCCESSOR TO

F. H. CLEMENT CO.,  
GLEN COVE MCH. CO., LTD.,  
GOODSELL & WATERS,  
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Builders and Designers of IMPROVED

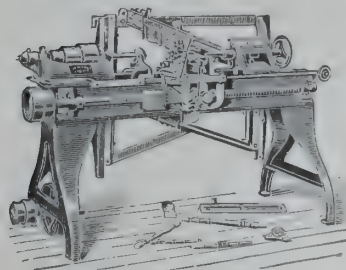
## Wood-Working Machinery

FOR EVERY PURPOSE.

Special Attention to Export Trade.

Catalogue and information cheerfully furnished upon application to main office,

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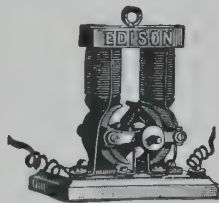


F. H. Clement Co.'s Patent Automatic Lathe.

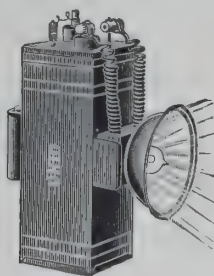
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Dollar Motor.



\$6 Bicycle Light, \$2.75

We undersell all on everything Electrical.

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CLEVELAND, OHIO, U. S. A.

HEADQUARTERS FOR ELECTRICAL NOVELTIES.

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HOWARD & BULLOUGH, ENGLAND.CONTRACTOR AND IMPORTER OF ALL KINDS OF  
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Bleaching Establishments, Print Mills, Etc.A complete line of Accessories for Cotton Machinery, Etc.,  
always on hand.

## WOLVERINE MOTOR WORKS,

Grand Rapids, Mich., U. S. A.



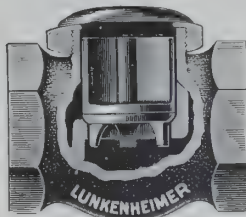
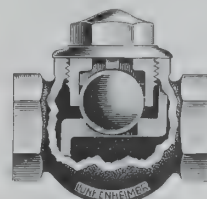
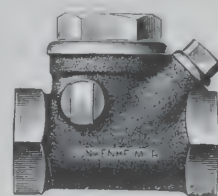
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## ENGINES AND LAUNCHES.

We manufacture Propeller, Side Wheel and Stern Wheel  
Launches. Send for Catalogue.

## Lunkenheimer's Check Valves,

Made of Gun Metal (U. S. Government Standard), are warranted the best of their kind made. Every valve tested and warranted as represented.

No. 1.  
Horizontal Check Valve, 1/4 to 3 in.No. 2.  
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Larger sizes in Iron Body, Brass Mounted.

Made in Screw or Flange Ends, English Standard.

Specify "LUNKENHEIMER'S" and order through Export Commission Houses.  
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BARRED PLYMOUTH ROCKS.  
BEST AMERICAN BREED.

We raise FANCY POULTRY in all the Popular American Breeds, and have had a large experience in SHIPPING FOR EXPORT.

Barred Plymouth Rocks,  
White and Laced Wyandottes,  
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Also a full line of SUPPLIES, such as Incubators, Brooders, Green Bone Mills, Drinking Fountains, Nest Eggs, Caponizing Tools, Etc. Poultry Foods and Medicines. Bee Supplies.

ILLUSTRATED CATALOGUE FREE.

Also Garden and Farm Seeds  
of Highest Quality.JOHNSON & STOKES, 217 & 219 Market Street,  
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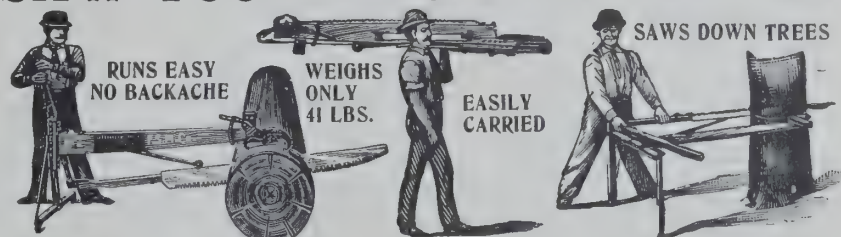
THE ACT OF CLOSING LOCKS THE TILL.  
OVER ONE MILLION NOW IN CONSTANT USE.No key to  
be lost.Susceptible of  
32 changes.Opens like a  
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to sneak  
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finished in  
Walnut, Oak  
or Cherry  
Woods.Varnished and  
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cabinetwork,  
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its cost.

SOUNDS THE ALARM PROMPTLY IF TAMPERED WITH.

Delivered (1/2 doz. in a case) Free to vessel. Catalogue in Spanish, French, German or English.

TUCKER &amp; DORSEY MFG. CO., Indianapolis, Ind., U. S. A.

## SAW YOUR WOOD WITH THE FOLDING SAWING MACHINE

RUNS EASY  
NO BACKACHEWEIGHS  
ONLY  
41 LBS.EASILY  
CARRIED

SAWS DOWN TREES

It saws down trees. Folds complete as a pocket knife. Weighs only 41 lbs. One man can carry it on his shoulder easily. It saws any kind of timber on any kind of ground. It is instantly adjusted to the ground and log so that the log is always cut square in two. It makes no difference how rough the ground is, and the operator never has to bend his back. 9 CORDS have been sawed by one man in 10 HOURS. It is a great labor and money saver, as one man can saw more wood with it than two men can in any other way, and do the work a great deal easier. It is made in two sizes. No. 1 carries a saw 5 1/2 or 6 feet long and saws any tree under 3 feet in diameter. No. 2 carries a saw 5 1/2, 6, 6 1/2 or 7 feet long and saws any tree under 5 1/2 feet in diameter. Send for free illustrated catalogue showing latest improvements and complete description, and special prices in large lots. Net Price List, F. O. B. New York, Weights and Measurements.

One No. 1 machine	.....	\$15 00 each;	Gross Weight, 84 lbs.;	Measurement, 5' 3" x 3' 10" x 3' 10"
One-half doz. No. 1 machines	.....	13 00	"	5' 9" x 3' 6" x 3' 0"
One No. 2 machine	.....	18 75	"	6' 0" x 3' 8" x 3' 0"
One-half doz. No. 2 machines	.....	15 00	"	6' 0" x 3' 8" x 3' 0"

Or THEODORE CARR, 26 Lisimore Terrace,  
Carlisle, England, our Agent for Great Britain.FOLDING SAWING MACHINE CO.,  
64-66 S. Clinton St., Chicago, Ill., U. S. A.



### American Exports to South Africa.

FOR the year ending June, 1897, the South African countries imported from the United States goods to the value of \$16,953,127, and in the year ending June, 1898, the figures rose to \$17,357,752. The following classified exports for the year ending June, 1897, give a fair idea of the diversified nature of the trade being done with American manufacturers:

Mowers and reapers.....	\$209,750
Plows and cultivators.....	146,238
Small implements.....	60,828
Carriages and vehicles.....	328,463
Instruments and apparatus for scientific purposes, including telegraph and telephone.....	180,389
Typewriters.....	19,513
Machinery (small and not specified).....	1,380,648
Tools.....	95,046
Stoves.....	55,297
Harness.....	10,819
Paints.....	17,722
Clocks.....	25,756
Bicycles.....	111,986
Tinware.....	24,869
Varnish.....	14,841
Lumber.....	624,580
Doors, sash and blinds.....	114,200
Household furniture.....	385,351
Woodenware.....	34,680
Munufactures of wood not specified.....	268,518

### The World's Output of Coal.

THE following table has been compiled by Dr. E. W. Parker, of the United States Geographical Survey, giving the coal output of the principal countries, for the years nearest 1896, for which figures could be obtained. The table will appear in the report of the survey for 1896. The long ton is 2,240 pounds and the short ton 2,000 pounds:

Country.	Usual unit in producing country.
Great Britain (1896), long tons.....	195,361,260
United States (1896), long tons.....	171,416,390
Germany (1896), metric tons.....	112,437,741
France (1896), metric tons.....	29,310,832
Austria-Hungary (1895), metric tons.....	32,654,777
Belgium (1895), metric tons.....	21,213,000
Russia (1896), metric tons.....	9,079,138
Canada (1896), short tons.....	3,743,034
Japan (1893), short tons.....	3,400,000
India (1895), long tons.....	4,441,890
New South Wales (1895), long tons.....	3,737,536
Spain (1896), metric tons.....	1,878,399
New Zealand (1894), long tons.....	719,546
Sweden (1895), metric tons.....	223,652
Italy (1895), metric tons.....	305,321
Transvaal (1895), long tons.....	1,152,206
Queensland (1895), long tons.....	322,977
Victoria (1895), long tons.....	194,171
Natal (1895), long tons.....	153,951
Cape Colony (1895), long tons.....	87,985
Tasmania (1895), long tons.....	36,856
Other countries.....	2,000,000
Total in English tons.....	589,732,000
Percentage of Great Britain.....	33.1

The total under "other countries" includes China, Turkey, Servia, Portugal, Colombia, Chile, Borneo and Labuan, Mexico, Peru, Greece, etc.

**American Artesian Wells and Windmills in Mexico.**—Mexico is steadily advancing in wealth and prosperity. Her home industries are expanding, and her foreign trade is increasing. We doubt if any other nation has advanced so much during the last ten years. In the late years a good many Americans have gone into Mexico with the purpose of engaging in agriculture, mainly in the raising of coffee; but some have taken to other branches—stock and fruit raising and regular farming. These emigrants call for improved machinery, such as they used at home, and thus are doing good introductory work. Lack of water is Mexico's greatest disadvantage, and down there they are learning from these Americans how to supply this need by providing themselves with artesian wells, "bored" wells and windmills. An artesian well recently put down in the plaza of the city of Leon, state of Guanajuato, broke forth at the depth of about 700 feet and gave a splendid flow of water. The success of the undertaking has been widely published, and has pointedly called attention to this system of obtaining a supply of water.

### Spain's Iron Ore Industry.

OFFICIAL statistics in *Revista Minerva* place the Spanish iron ore production in 1897 at 7,468,500 tons, as against 6,762,582 tons in 1896. Last year's production was the highest on record. The province of Vizcaya (Bilbao) alone produced 5,170,000 tons, or more than 75 per cent. of the total. The largest iron ore producer is the La Orconera Company, of Bilbao, whose output in 1897 aggregated 957,710 tons, as against 951,602 tons in 1896. The export of iron ore increased from 6,272,588 tons in 1896 to 6,884,588 tons in 1897. Shipments from Bilbao for the year amounted to 4,697,993 tons, or about 70 per cent. of the total. The principal foreign consumers are shown in the following table:

Countries.	1896. Met. Tons.	1897. Met. Tons.
Germany (direct).....	8,734	31,967
Holland (on transit for the German Ruhr dis.)..	954,413	1,026,727
Austria-Hungary.....	.....	10,350
Belgium.....	206,731	224,776
United States.....	84,203	59,243
France.....	382,548	435,972
Great Britain.....	4,635,959	5,091,027
Sweden and Norway.....	.....	4,526

**Not Even Noticeable.**—A Michigan shingle mill recently cut 228,000 white cedar shingles in ten hours on a ten-block and one-hand machine. A Pacific Coast journal says that is all right for Michigan, but such a record would go unnoticed on that coast.

**A Model American Home.**—One of the features of the Paris Exposition in 1900 will be a building representing in its exterior and interior a model American home. It will be constructed of material supplied by American builders, and will be decorated and furnished throughout by American manufacturers. It will be cared for by a committee of American women of high social position, and it is expected that it will be a rendezvous for all Americans visiting the Exposition.

**American Clothespins Abroad.**—Americans sell clothespins practically everywhere—all over Europe, in South Africa, South America, Australia and elsewhere. Some clothespins are made, for the supply of local markets, in Sweden and in Scotland, but they are big and clumsy pins, twice the size of the Americans', whittled out by hand, and American pins are sold in both these countries in competition with the home production. Clothespins are made chiefly of beech and maple; some are made of tupelo gum. They are made entirely by machinery, counted into boxes, containing 720 each, by machinery, and the boxes are nailed up by machinery.

**American Steel for British Ships.**—In an article headed "American Steel Plates for British Shipbuilders," the *Journal of Commerce*, of Liverpool, England, says: "A Pittsburg company has received orders for 770 tons of steel plates, to be used in construction of steamers at one of the largest shipbuilding yards at Belfast. The dimensions of the plates are 28 by 5 feet, the weight of each plate being between 4,000 and 5,000 pounds. Shipment will be sent forward early this month, and space on one of the European liners running from Boston has already been engaged. This is believed to be the first shipment of this nature ever sent from the United States."

The order referred to by the *Journal* was taken from Baltimore three months ago by the steamers Lord Charlemont and Algoma and delivered at Belfast, Ireland. It comprised over 600 tons of plating, cut in needed sizes for shipbuilding by the great Irish shipbuilders, Harland & Wolff. The plating was made in Pittsburg.

**Marvelous Strides in the Electrical Industries of the United States.**—Surprising as the development of electricity in practical ways has been during the past twenty years it requires a statistical exhibition of the subject, particularly on the financial side, to furnish an adequate picture of this progress. A recent examination of the subject furnishes some interesting details. For instance, it is stated that as recently as 1884 the total investment in electrical appliances throughout the United States did not aggregate much over \$1,000,000, while at the present time the total capitalization of electrical railroad, lighting and other concerns is put down as fully \$1,900,000,000. The 14,000 miles of electrical railroads which exist to-day in the United States represent a capitalization, at its par value, of about \$1,000,000,000, while the electric lighting stations and plants in the country are believed to represent an investment of fully \$600,000,000, the capital involved in the telephone business and all its ramifications being placed at not less than \$100,000,000.—*Bradstreet's*.



# THE BRADFORD BELTING CO.

CINCINNATI, OHIO,  
U. S. A.

MANUFACTURERS OF

**Pure Oak Tanned  
Short Lap Single  
AND  
Double Belting.**

BRANDS:

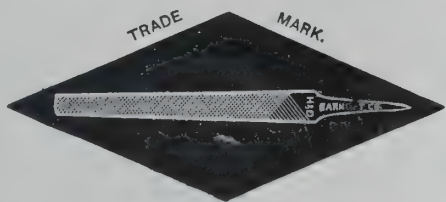
"Monarch" and "Bradford  
Dynamo" Rivetless Leather  
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Please refer to this paper when  
answering this advertisement.



## Black Diamond File Works

Twelve  
Medals of  
Award at  
International  
Expositions



Special  
Prize Gold  
Medal  
Atlanta, 1895

**G. & H. BARNETT CO., Philadelphia, Pa.**

## Paper Bag Machinery.

We manufacture machines for making  
light and heavy weight, satchel bottom,  
manilla or express bags, from one-quarter  
pound to twenty-five pound, inclusive.  
Also shirt, hat, millinery and flour bags.

## THE NATIONAL MANUFACTURING CO.,

Manufacturers of Paper Bags  
and Paper Bag Machinery.

**ELKHART,  
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CORRESPONDENCE INVITED.

## SINTZ GAS ENGINE COMPANY,

GRAND RAPIDS, MICHIGAN, U. S. A.



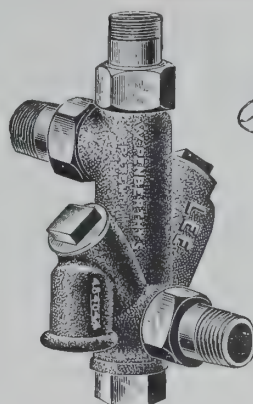
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of

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Stationary  
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Gasoline**

**Engines,**

**ALSO YACHTS AND LAUNCHES** fully adapted for tropical countries.

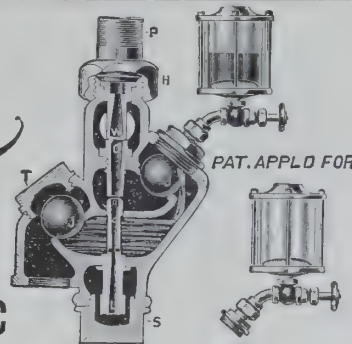
**The Best Is Always the Cheapest!** We are the oldest builders of Marine Gas Engines  
in the United States and guarantee superiority. Enquire of your boat builder, or address us at  
home office.



**BALL  
VALVE**

**Automatic**

**INJECTOR.**



**PERFECT BOILER FEEDER. COMPLETE PURGER INJECTOR.**

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SEND FOR CATALOGUE.

**LEE-PENBERTHY MANUFACTURING CO.**

**Detroit, Mich., U. S. A.**

Orders received through any responsible commission house in the United States.  
Please send us duplicate of order to avoid delay or mistake.



THE MILBRADT

## Rolling Step Ladders

ARE THE

**LATEST IMPROVED, the  
NEATEST, SAFEST, EASIEST**

operated, and the

**BEST ROLLING LADDERS**

in every respect in the world.

To save delays, order at once with the following measurements, viz.: Height from floor to top of base shelf; Width of base shelf to front edge of shelving; Height from base shelf to top of shelf where track is to be fastened. State the number of feet of track wanted and the length of pieces required, so that joints of track will meet at partitions in shelving. The pieces of track are to be as near to as possible, but inside of 18 feet long. State the number of brackets required to hold up track.

For catalogue address

**G. A. MILBRADT & CO.**  
ST. LOUIS, MO., U. S. A.

## Dietz Tubular Square Lamp

Is most desirable for sheds and porches, also for barns, stables, outbuildings, etc., where "no smoking" is desired. This is an extra fine Lamp, made in three sizes, has no chimney, and no complication to make trouble of any sort. It has an improved burner and outside wick regulator; gives a very brilliant light that the strongest wind cannot quench—and, in general, it gives universal satisfaction. The list prices of the three sizes of this lamp are \$5.50, \$6.50 and \$8.50, and the export discount 40, 10 & 5 per cent.



The Catalogue, which we gladly mail upon request, will give you an idea of the extent of our line of Lamps and Lanterns with prices and discounts.

## R. E. DIETZ COMPANY

60 Laight Street, New York, U. S. A.

Established in 1840.



## MOSS' UNION BLACKING



**NONE BETTER on the MARKET**

Orders filled through any responsible  
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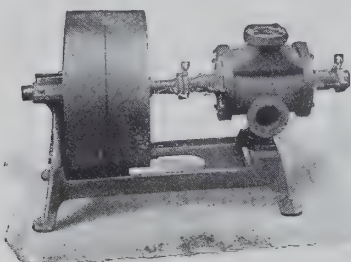
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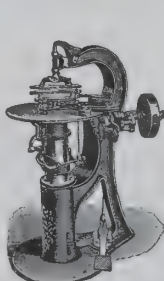
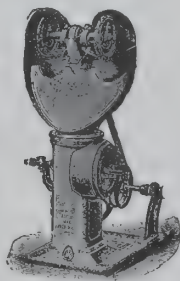
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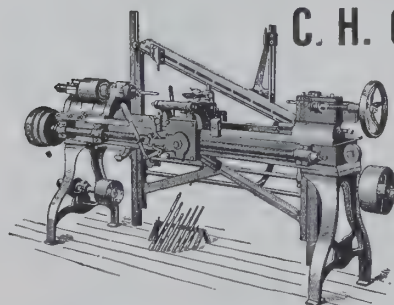
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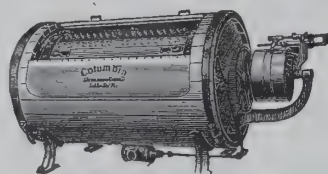
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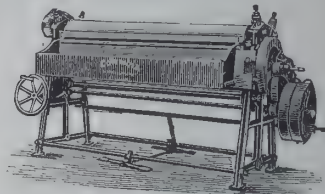
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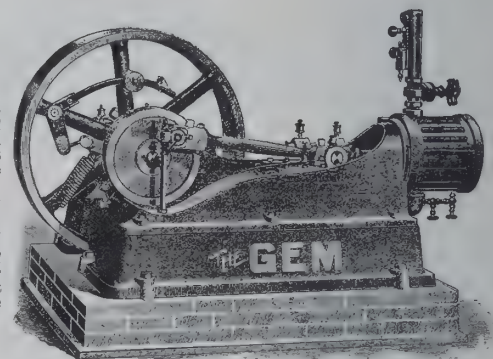


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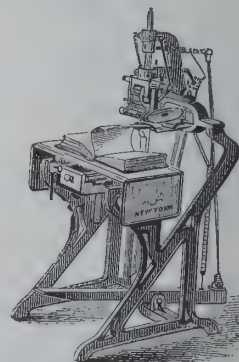
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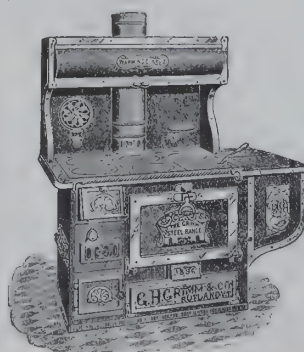
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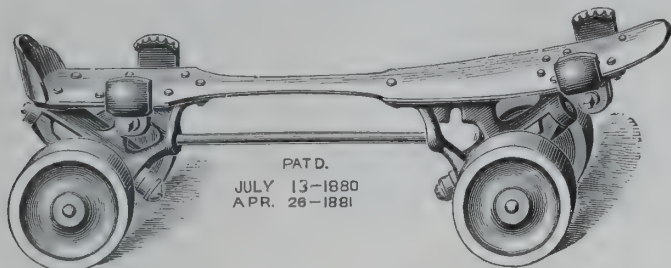
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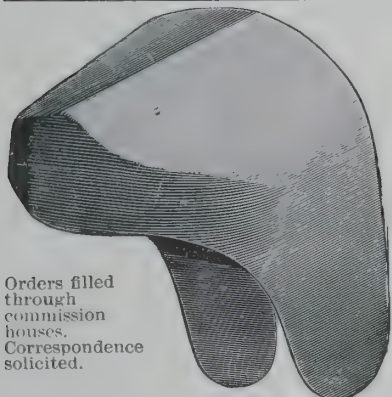
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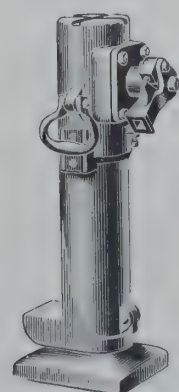
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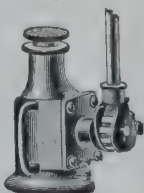
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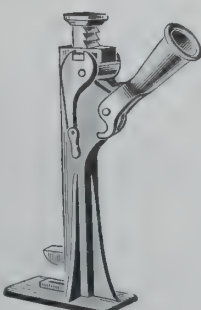


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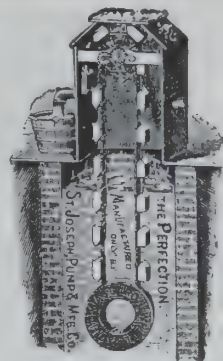
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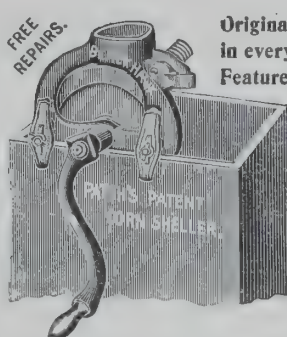
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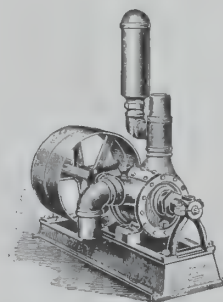
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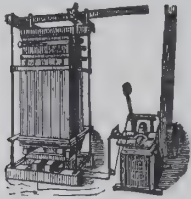
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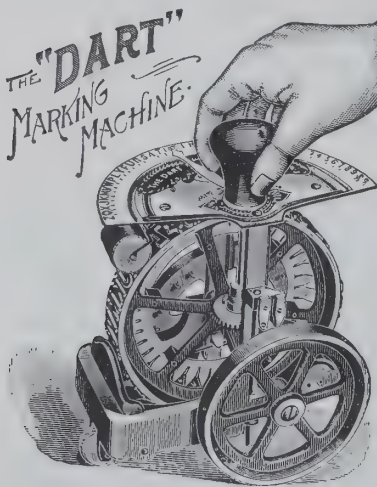
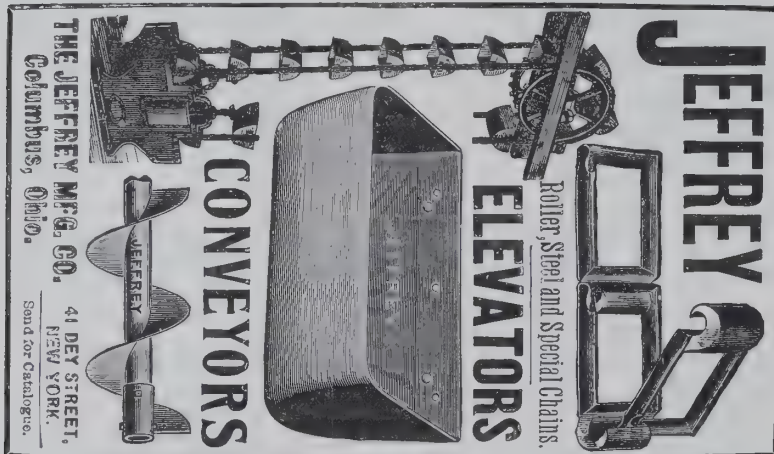
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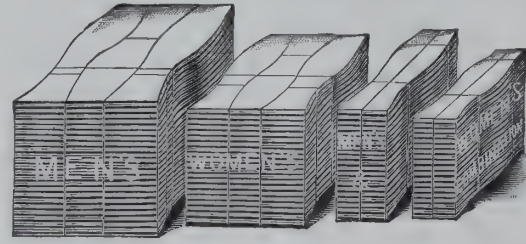
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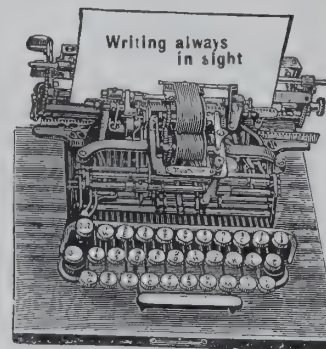
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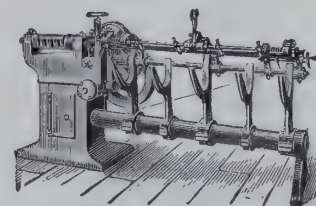
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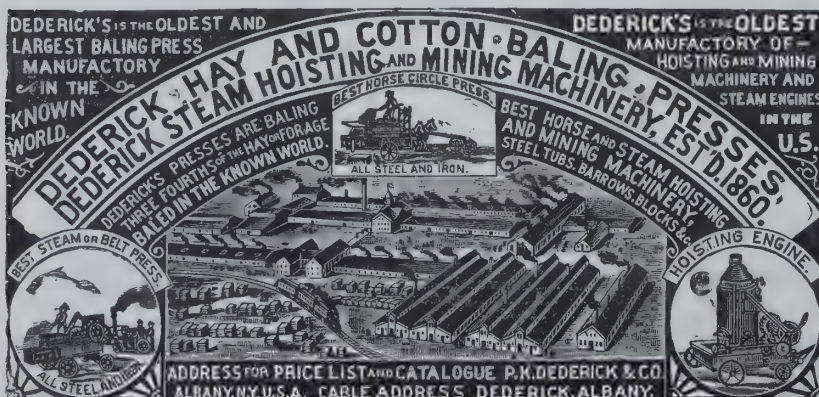
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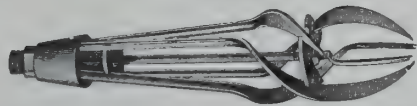
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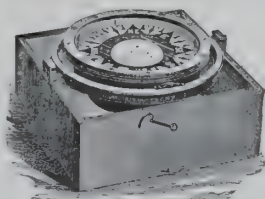
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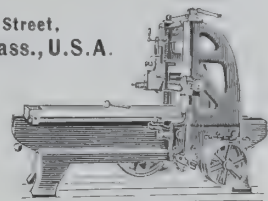


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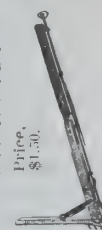
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Worcester, Mass., U.S.A.  
Manufacturers and Exporters of

**METAL PLANERS,  
HAND AND POWER PUNCHES AND SHEARS**  
Orders filled through Com. Houses. Correspondence solicited.  
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This Stretcher works on an entirely new principle. It draws your weight with the carpet. No marring baseboard, pounding fingers or getting down on the knees. Operator stands in an upright position to stretch and tack carpet. Can fold carpet under and stretch two thicknesses as easy as one. The tacking device is simple and will drive 60 tacks per minute. Tacks can be driven in corner closer than with a hammer. Every machine guaranteed. Splendid seller. One agent took 38 orders in two days. Sample sent on receipt of \$1.00; one dozen, \$8.00; two dozens, \$15.00. F. O. B. New York. Two dozens weigh 90 lbs. Write for cartoon circular. One dozen Columbia Tack Pullers sent with stretchers, \$1.00; retail price, 25c. We handle other specialties. **The Goddard & Allen Co.,** 200 "A" St., Beloit, Wis., U. S. A.



**WEST PULVERIZING MACHINE CO.,**  
220 Broadway, New York, U. S. A.

Crushers, Dryers, Rotary Kilns, Pulverizing Machinery for All Materials, Sectional, Plain and Continuous Feed and Discharge Cylinders, Tube Mills, Grit Mills, Ball Mills, Chaser Mills, Flint Pebbles, Clay-working Machinery. Porcelain Linings for All Sizes in Stock.

Complete Equipments furnished for CEMENT MANUFACTURING PLANTS, Etc.

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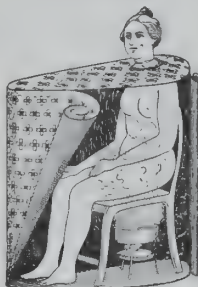
**Folding, Thermal Vapor Bath Cabinet**

Has no equal for its Curative Properties and General Bathing Purposes.

**Hot Air, Vapor, Medicated or Turkish Baths  
at Home, with or without Face Steaming Attachment.**

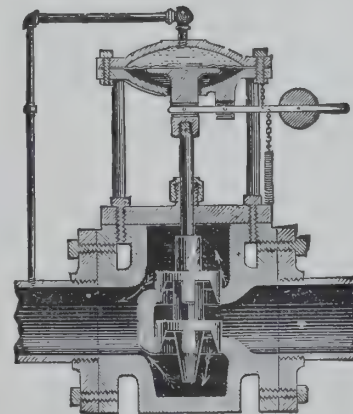
Cures Colds, Rheumatism, Gout, Neuralgia, La Grippe, Female Complaints, All Blood, Skin, Nerve and Kidney Diseases. Reduces Surplus Flesh, Beautifies the Complexion.

Size, 39x1 inch, folded; weight, 7 lbs. It is not a cloak or sack, but a cabinet supported by galvanized frame. Agents wanted. In ordering through export commission house send us duplicate order.

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27-29 Summit Street,

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Manufacturer of

**Steam and Water Specialties,**

79 & 81 WASHINGTON STREET,  
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**Improved Turkish and  
Vapor Baths at Home.**

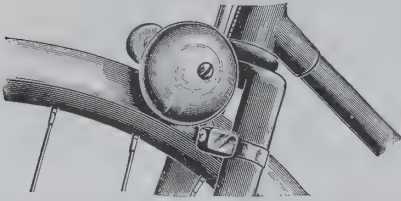
Only practical Cabinet made. Bath Room and Sanitarium combined. The Ladies' Friend. Gives Youth and Vigor. Cures Rheumatism, Neuralgia, La Grippe, Colds, Liver and Kidney Trouble. Makes Clear Skin and Soothes the Nerves. The only Cabinet in the World which has a door. You heat it up, step in, then use as cooling room and step out. Cabinet forming a room within itself.

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**THE ERICSON AUTOMATIC BICYCLE BELL. (Patented.)**

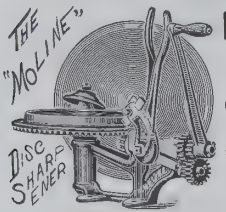
NUTTER, BARNES & CO., 366 Atlantic Ave., Boston, Mass., U. S. A.

The cut represents the Ericson Automatic Bicycle Bell attached to the front fork of the machine by a clamp bracket and operated by a friction pulley thrown in contact with the tire of the front wheel, and connected by a small lever on the left handle-bar which can be pressed by the fore-finger without moving the hand out of position. We claim this bell is simple, durable and effective, does not rattle, is easily adjusted and will give a short or continuous ring, as desired. All the parts are nickel-plated and highly finished. Made in two sizes—2½ and 3 inches. Correspondence solicited. Orders filled through commission houses.

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**BOMMER**  
**\* SPRING HINGES \***  
**ARE THE BEST**  
**"PRACTICALLY UNBREAKABLE"**  
**SAYS THE WORLD'S FAIR AWARD.**

Made of WROUGHT STEEL, Bronze or Brass.  
 BOMMER BROS. 351-353 JAY ST. BROOKLYN, N.Y. U.S.A.

**Disc Harrow Sharpener,**

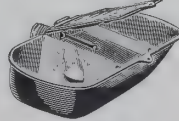
For sharpening all kinds of disc farm implements. Too cheap to do without.

**OUR STOCK WATERERS**

Will keep stock healthy.

Send for prices. When ordering through commission house, send duplicate order to us.

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WITH THE MODEL. **HATCH CHICKENS** WITH THE **WOODEN HEN**

**EXCELSIOR INCUBATOR.** Simple, Perfect, Self-regulating. Thousands in successful operation. Guaranteed to hatch a larger percentage of fertile eggs, at less cost, than any other Hatcher.

**WOODEN HEN** Most efficient small incubator ever invented. Perfect in every detail. Just the thing for poultry raising on a small scale, 28 egg capacity. Catalogue free.

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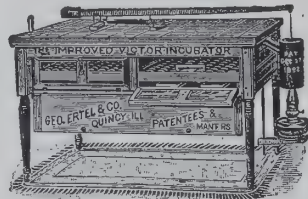
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**MACHINERY, BICYCLES, RUBBER GOODS and NOVELTIES**

Forwarding and Insurance of Export Goods a specialty.

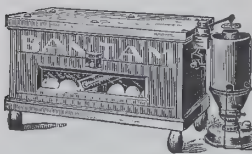
CORRESPONDENCE IN GERMAN, FRENCH AND SPANISH SOLICITED.

**HATCH CHICKENS** by the hundred with the Improved **Victor Incubator**. It is a pleasure to operate, absolutely self-regulating, needs no watching during day or night. Its hatching qualities are second to none. Thousands in successful operation; the simplest, most durable and cheapest first-class Hatcher in our market. A written guarantee is sent with each machine to be as represented or money refunded. Circulars free. Catalogue 4 cents. Address **Geo. Ertel Co., Patentee & Mfg., Quincy, Ill., U. S. A.** Established 1887. In ordering through export commission houses, send us duplicate order.

**YOU CAN MAKE MORE MONEY**

Raising poultry with incubators than in any other crop. This illustrates our Bantam 50-egg size incubator from which thousands of our patrons have hatched 48 chicks at once. It is first class in every particular and fully guaranteed. A child can operate it. Our price is \$5.75 here or \$6.50 boxed for export, delivered, freight paid to New York City. We also make other and larger incubators and brooders, all fully described in Catalogue K, which we will send for the asking.

**BUCKEYE INCUBATOR CO., Springfield, O., U.S.A.**

**ECO MAGNETO****Watchman's Electric Clock,**  
WITHOUT BATTERIES.

Used in all buildings where Watchmen are employed. Thousands in use in the United States. Correspondence solicited. Catalogues on application.

**Eco Magneto Clock Co., 620 Atlantic Ave., Boston, Mass., U.S.A.**



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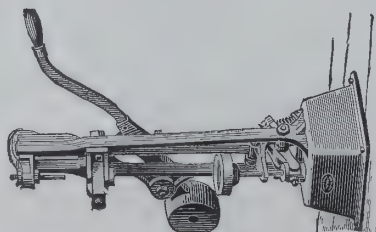
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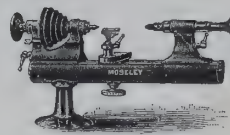
**Quality is the Standard of Value.**

Originators, Designers and Manufacturers of the

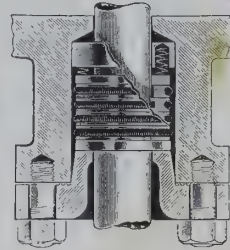
**American Hollow Spindle Bench Lathe and Split Self-Centering Chucks.**

Indispensable for the watchmaker, the tool maker and the manufacturer. When interested write

**MOSELEY LATHE CO., - Elgin, Ill., U. S. A.**



Watchmaker's Lathe.



**The Warren Specialty Mfg. Co.,**

Manufacturers and Exporters of

**Metallic Rod Packing**

For Piston Rods and Valve Stems,

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Orders Filled Through Commission Houses. Correspondence Solicited.

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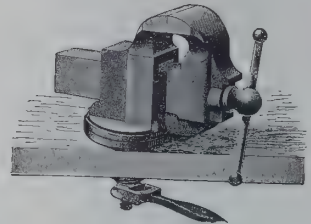
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MANUFACTURERS OF

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**The Steam Merry-go-round .... Money-Maker.**

Affords delightful amusement for old and young. Attractive and simple in construction and operation. Complete outfit, seating 56 people, with galloping horses, chariots, organ, engine and boiler, ample tent. Send for Illustrated Circular, Prices, etc., to the Manufacturers.

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**PATENT EXPANSION STEM,**

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This is our New Double Adjusting Stem for which there is an enormous demand. It does away with the head clip and adjusts the bar and also the stem in head by tightening the nut on the top. It improves the looks of wheel and makes it very effective. It is made of Carbon Forged Steel, and are guaranteed in every way. Catalogue on application. Orders filled through commission houses.

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**Sterling Bicycle Bells**

ARE THE BEST IN THE WORLD.

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Direct Current,

Slow Speed

**Dynamos and Motors.**

**ROCHESTER, N. Y., U. S. A.**

Orders filled through commission houses.

Catalogue "C" on application.

Correspondence solicited.

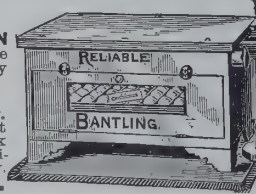
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HAS LOST HER OCCUPATION and in the production and brooding of chicks she has been supplanted by the better and every way

**RELIABLE INCUBATORS AND BROODERS**

They Hatch and Brood when you are ready. They don't get lousy. They grow the strongest chicks and the most of them. It takes a 224 page book to tell about these machines and our Mammoth Reliable Poultry Farms. Sent by mail on receipt of 10 cents. Send for it now.

Reliable Incubator and Brooder Co., Quincy, Illinois.



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NATURE'S METHOD IMITATED.

It eliminates both organic and inorganic matter, and at the same time aerates it with sterilized air, making it not only absolutely pure, but as palatable as spring or mineral water. The **SANITARY STILL** goes on any stove, requires no water connections; simple and efficient. Will last a lifetime. Price, \$10 to \$15. Catalogue on application. Satisfaction guaranteed or money refunded.

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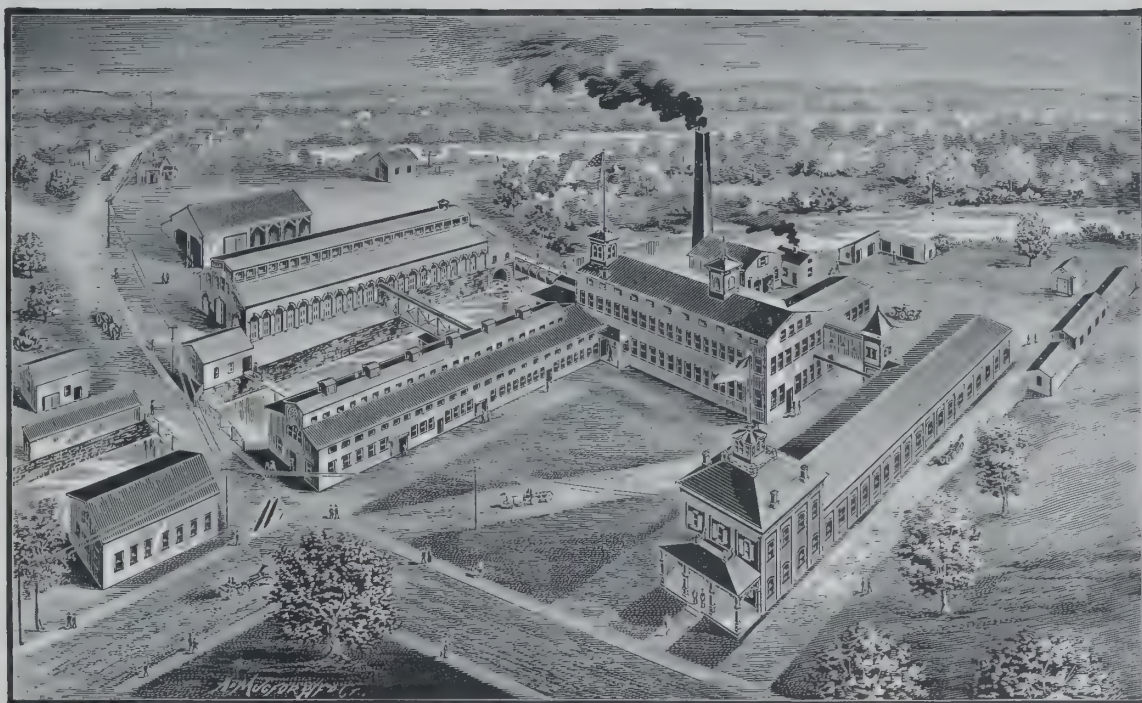


# THE H. D. SMITH & CO.

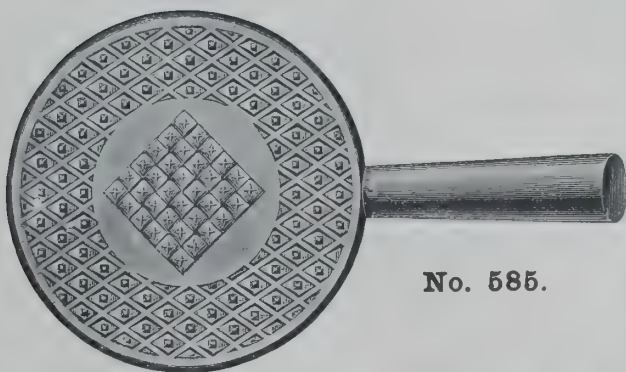
PLANTSVILLE, CONN., U. S. A.

MANUFACTURERS OF

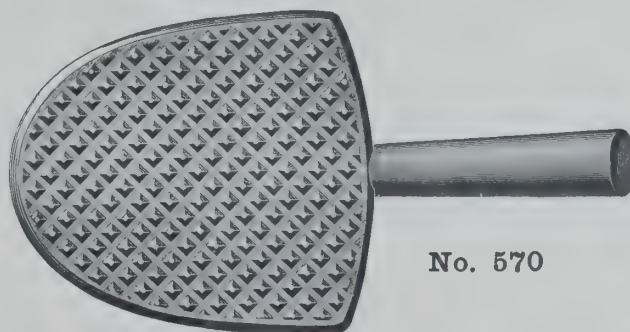
## CARRIAGE MAKERS' FORGED IRONS.



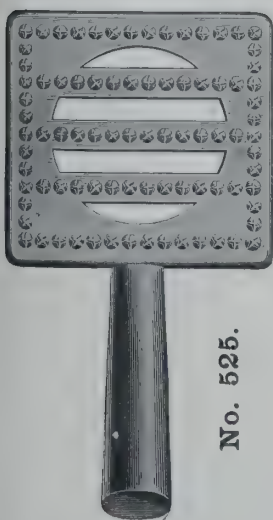
THE H. D. SMITH & CO WORKS, PLANTSVILLE, CONN., U. S. A.



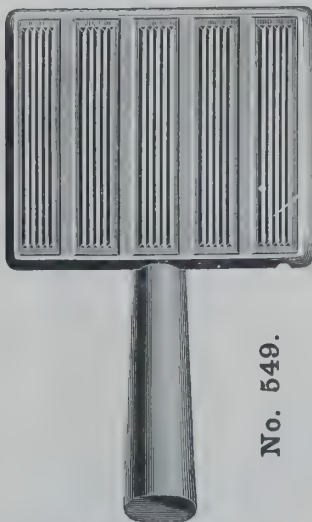
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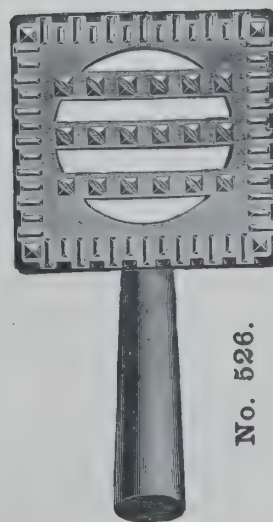
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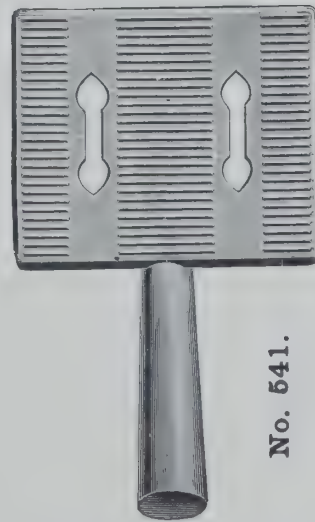
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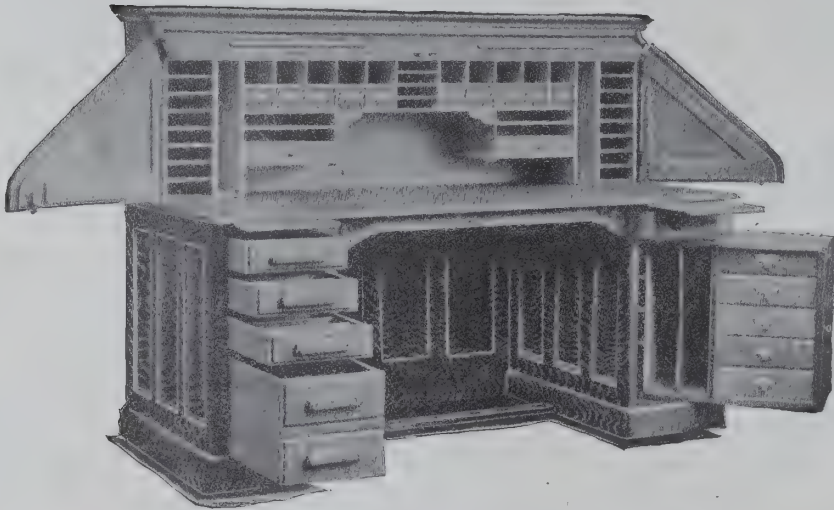


# DESKS!

# DESKS!!

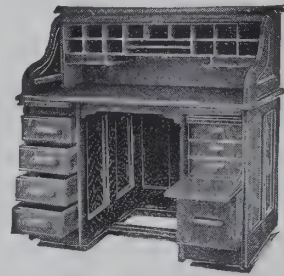
DIRECT FROM THE FURNITURE CENTER OF THE WORLD.

We make a complete line of fine Office and Library Furniture, including Roll Top Desks, Flat Top Desks, Bookkeepers' Desks, Typewriter Desks, Letter Files, Card Indexes, Revolving Desk Chairs, Book Cases and a complete line of luxurious Turkish leather Easy Chairs and Couches. We illustrate and quote prices on the few desks below to give an idea of our line and prices of desks. We issue FOUR Complete Catalogues, any one or all of which will be mailed, together with prices, to any address upon request.



NO. P. 301, "A."

**\$45.00** buys this desk exactly as illustrated. It is 66 inches long, 33 inches wide, 51 inches high. It is made of the finest selected quarter sawed white oak, and has swinging side arms and FIVE COMPLETE LETTER FILES. 66 inches long, style "A," \$45.00. Style "B" or "C," \$41.00. 72 inches long, style "A," \$49.00. Style "B" or "C," \$45.00.



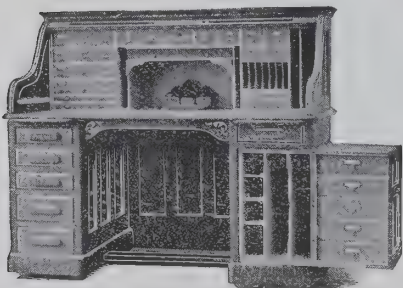
NO. P. 10 E.

**\$19.75** buys this desk exactly as illustrated. It is 48 inches long, 30 inches wide, 51 inches high. It has quarter-sawed oak front, closed back and THREE LETTER FILES in right pedestal under lock and key. This desk has been a GREAT SELLER.



NO. P. 243, STYLE "B."

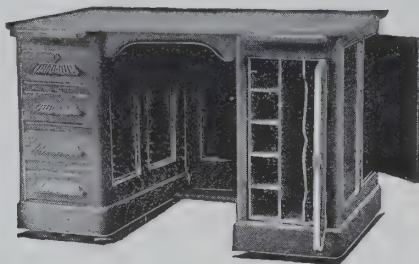
**\$17.00** buys this desk exactly as illustrated. It is made of quarter-sawed white oak and is supplied with LETTER FILES and large drawer in right pedestal. Size, 36 inches long, 28 inches wide, 44 inches high.



NO. P. 212, STYLE "A."

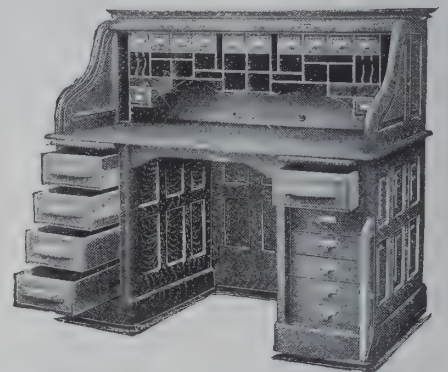
**\$43.50** buys this desk exactly as illustrated. It is 60 inches long, 33 inches wide, 52 inches high. It is an extra fine desk, made of quarter-sawed white oak and has FIVE COMPLETE LETTER FILES in the right swing pedestal.

60 inches long, style "A," \$43.50.  
Style "B" or "C," \$40.00



NO. P. 216, "C"

**\$11.60** buys this desk exactly as illustrated. It is 50 inches long, 30 inches wide, 31 inches high. It has closed back and is made of selected oak. Style "B" or "C," \$11.60.



NO. P. 241, STYLE "A."

**\$35.00** buys this desk exactly as illustrated. It is 55 inches long, 32 inches wide, 51 inches high. It is made of the best figured quarter-sawed oak or cherry, and has FIVE COMPLETE LETTER FILES in right pedestal.

50 inches long, style "A," \$32.50. Style "B" or "C," \$27.50.  
55 inches long, style "A," \$35.00. Style "B" or "C," \$30.00.  
60 inches long, style "A," \$37.50. Style "B" or "C," \$32.50.

**NOTE.**—Style "A" has drawers in left pedestal and letter files in right pedestal as illustrated. Every person must have some place for letters, invoices, receipts, etc. Style "A" provides complete LETTER FILES within arm's reach, dust proof and under lock and key—a very desirable feature. Style "B" has drawers in both right and left pedestals. Style "C" has drawers in left pedestal and book cupboard in right pedestal.

## INFORMATION.

ALL PRICES given above include cost of boxing and delivery to New York City ready for export.

ALL DESKS are made of the best quality of white oak and are supplied in either light, medium or dark finish to suit purchaser, medium being supplied unless otherwise requested. All our desks are finished with best quality of piano polish finish.

ORDERS: We are well known to the leading export merchants of New York City, any of whom will be pleased to execute orders for our goods.

CONSTRUCTION AND PACKING: We have made a careful study of the needs of the export trade in this matter, and all desks are made with our "sectional construction," permitting them to be quickly taken apart and put together. This construction also permits snug packages, insuring both safe delivery and lowest freight rates.

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Makers of Office and Library Furniture.

Grand Rapids, Mich., U. S. A.

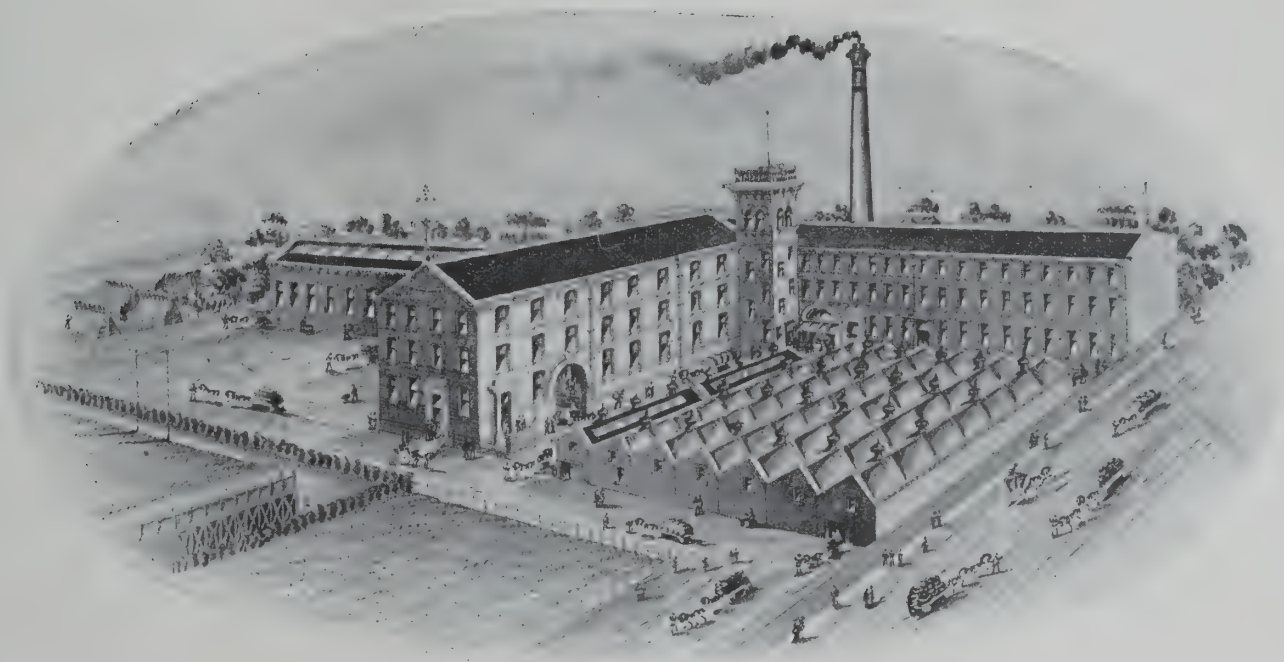


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# WILSON & INGHAM,

SOUTHBROOK MILLS,

MIRFIELD, - Yorkshire, England.



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## CARD CLOTHING



MAKERS OF SPECIALLY FINE

### Plough Ground Needle-Pointed Cards

With Smooth and Bright Hardened and Tempered Steel Wire; also  
Flat-to-bend and Angular in H. & T. Steel,  
Mild Steel and Plated Wire.



CARDING ENGINES CLOTHED, GROUND AND STARTED  
BY PRACTICAL MEN.



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BOSTON, MASS., U. S. A.

**Oldest and Largest Manufacturers  
of Boot Polishes in the World.**

Wholesale Manufacturers and Exporters of the following STANDARD BRANDS  
for BOOTS, SHOES and HARNESS:



## "GILT EDGE" OIL POLISH,

for ladies' and misses' shoes, is far superior to all others, as it blacks, polishes, softens and preserves the leather. Bottles hold about double the usual quantity. Price per gross, \$16.00; discount 10 per cent.

## "SUPERB" PATENT Leather Polishing Paste.

The only article that will produce a quick, brilliant and waterproof lustre without injury to the leather. The professional bootblacks of the United States use far more of this article than all other makes combined, because it



polishes quicker and easier, and requires less of it to do the work. Large size, per gross, \$8.50; discount 10 per cent. Small size, per gross, \$5.00; discount 10 per cent.

## "STAR" COMBINATION



package contains a 2-oz. bottle of russet leather cleaner and a small decorated tin box of russet leather polishing paste. The cleaner removes the dirt and stains, and the paste adds a brilliant, durable and waterproof polish. Price per gross, \$8.00; discount 10 per cent.

## "DANDY" RUSSET LEATHER POLISHING PASTE.

For giving russet and yellow colored shoes a brilliant, durable and waterproof polish. Try it once and you will never be satisfied with any other polish. Per gross, large size decorated tin boxes, \$8.50; discount 10 per cent. Small size, \$5.00 per gross; discount 10 per cent.



**FRENCH GLOSS.** Warranted fully equal to the best \$9.00 black dressings in the market (and put up handsomer). With handsome three-color lithographed cartons and wood caps over corks. Price per gross, \$8.00; discount 10 per cent.

Also Manufacturers of POLISHES for Chocolate, Ox-Blood, Green, Brown, Blue and Purple Russia Calf, Vici Kid, "Willow" Calf, etc. "ELITE" Combination for Box-Calf, Black Vici Kid, etc.; also Dyes for converting light shades of leather into any of the above-mentioned colors.

All first-class articles that suit every one. If you are not suited and want the best, send us a trial order. Orders can be sent through any commission house in New York or Boston. Send for illustrated price list.

# THE PELTON WATER WHEEL

affords the most simple, economical and efficient power for all purposes.

## 9,000 Wheels Now Running.

Best useful effect and highest satisfaction guaranteed under all conditions of service.

**PELTON WHEELS** are especially adapted to

## All Spanish-American Countries

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From 25 to 50 per cent. better results assured than from Turbines or any other form of wheel.

## No Repairs Needed Even with

water carrying slimes and grit so destructive to other wheels.

**WATER PIPE, TRANSMITTING MACHINERY** and all appliances connected with a power plant supplied on the most reasonable terms. Shipments made from New York or San Francisco as may afford the most favorable freight rates. Catalogues furnished on application. Address, giving conditions of service,

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# PHILADELPHIA NOVELTY M'F'G CO.

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## NOVELTY INKSTAND No. 3.

Novelty (Self-closing) Inkstand No. 3,

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(SMALL),  
Retail,



Retail,  
(LARGE),  
75 cents.

Novelty (Self-closing) Inkstand No. 1,

## PATENTED SPECIALTIES FOR EXPORT.

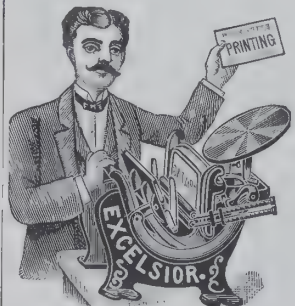
All our goods, numbering more than 50 different articles, are patented, controlled and manufactured exclusively by ourselves, and are sold all over the world, about one-half of our business being for export. They are all standard novelties in every sense of the word, and have been awarded numerous premiums at the universal expositions of Sydney, Melbourne, Adelaide, Barcelona and Paris, for novelty, workmanship, finish, simplicity, utility and cheapness.

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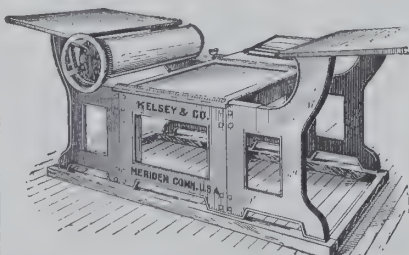
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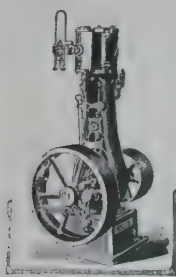
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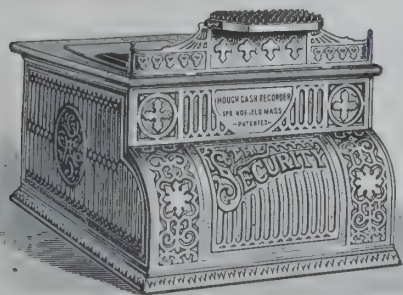
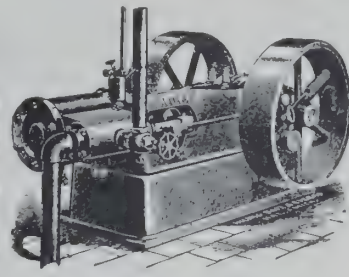
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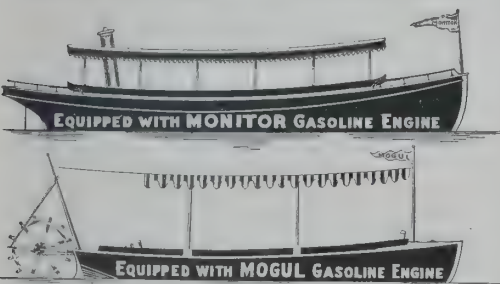
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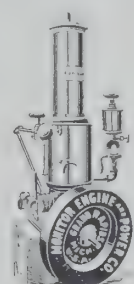
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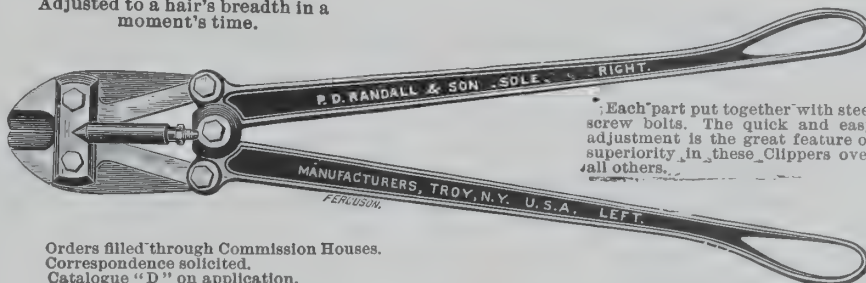
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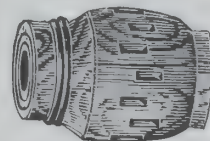
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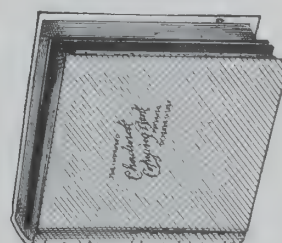


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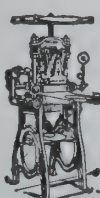


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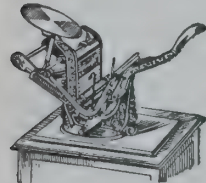
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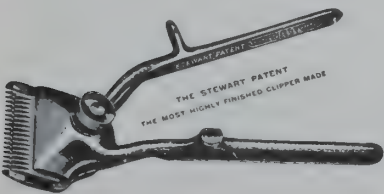


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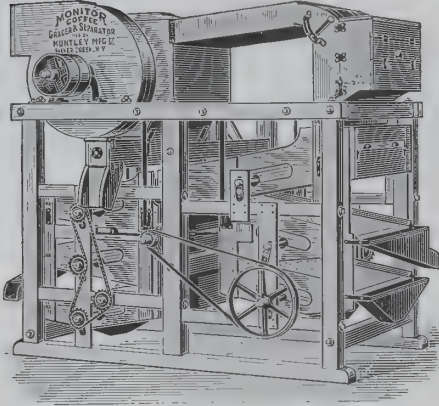
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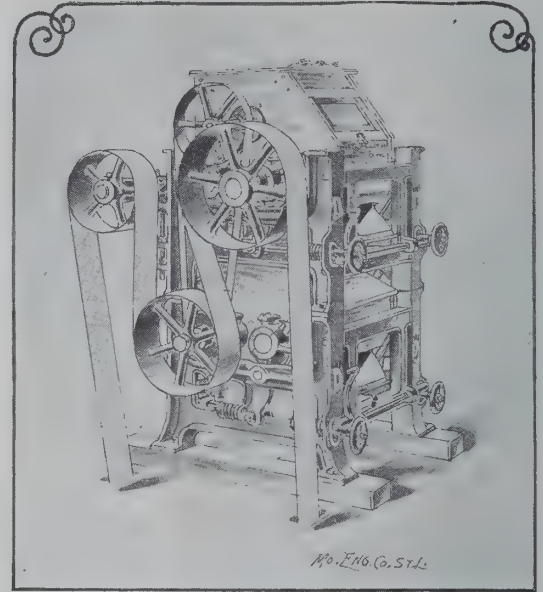
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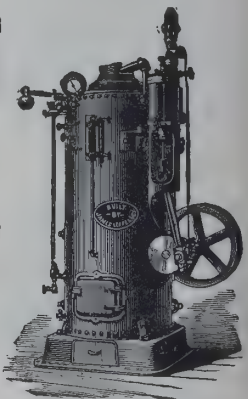
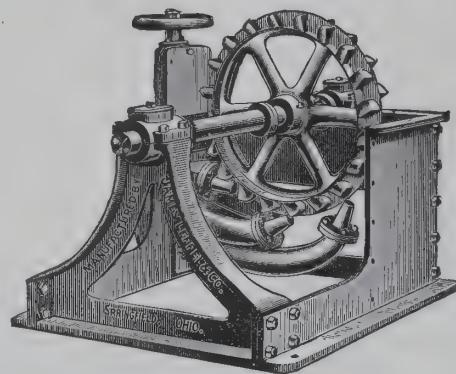
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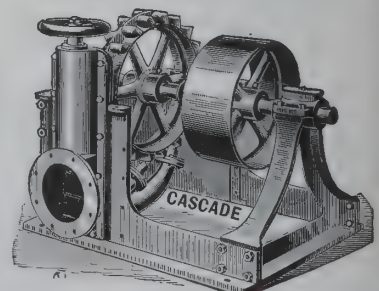
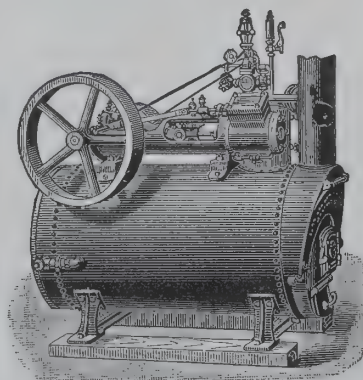
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(Founded by ROOT & TINKER, 1877),  
WITH WHICH IS INCORPORATED

## THE AMERICAN MAIL AND EXPORT JOURNAL.

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EDWARD N. VOSE, EDITOR.

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THE AMERICAN EXPORTER does not publish reading notices recommending goods of any special make. To do this for one manufacturer and not for another producing wares equally meritorious would be manifestly unfair. We therefore recommend our readers to carefully examine its advertising pages, which are filled with the announcements of many of the best manufacturing concerns in their respective lines. What our advertisers say therein affords highly interesting, instructive and profitable reading, especially for merchants and importers who desire to obtain all that is latest and best in the line of manufactured goods.

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Inquiries concerning goods advertised in this paper should be addressed direct to the advertisers themselves, or, if readers prefer to order through their American buying agents, the name of the manufacturer of the desired article should be carefully specified. As a rule, orders should not be sent direct but to experienced and reliable export commission merchants for execution.

We shall be pleased to send to foreign buyers not having buying agents in New York the names and addresses of reputable concerns best qualified to serve them, provided that they state the nature of their business and the class of goods they are most likely to require.

### POINTING THE WAY.

THIS is an industrial age. Productive enterprises are not only enormously diversified and numerous, but they are distributed far more widely than ever before in human history. In the ancient and medieval world most, if not all, manufacturing operations were extremely local, peculiar to particular districts or even cities. Thus Flanders, the region now included in the western half of Belgium and the Department du Nord in France, was the centre of the woollen industry of the civilized world for many years until the sagacity of the rulers of England and the folly of certain rulers of the Low Countries led to many of the operatives removing to Great Britain. Amiens, Valenciennes and scores of other cities in Northern Europe were similarly the chief seats of special industries that frequently occupied all of the inhabitants—men, women and children—the name of the town often appearing in the fabric or product thus produced.

Something very similar to this state of affairs still prevails to-day in certain parts of the world, notably in Switzerland, but taking the world as a whole the number of points where any important industry is carried on has now so vastly multiplied that only experts in each line can hope to be familiar with all the centres, much less all the individual concerns, and the distinctive features of the products of each. Even in the old world industrial conditions change. The buyer of handmade lace would still go to the old centres where inherited patience and skill enable human fingers to defy the now omnipresent machine. But new industries have arisen even there. The coal output of Valenciennes overshadows that of lace, Lille is as famous for its locomotives as for its gloves.

Everywhere is diversity, with still other and equally unrelated industries springing up every day.

Under these circumstances the buyer of no matter what class of articles must acquaint himself as never before with the facts regarding his particular industry in an immense number of places, and even countries. He can scarcely say without investigating whether the product best adapted to his purpose comes from his own immediate vicinity or from the other end of the world.

Suppose the buyer to be interested in furniture. If he is seeking the most costly, with elaborate hand-carving and of special design, he would perhaps do well to turn to Picardy or some of the other European centres of wood-carving, for certainly nowhere else could he hope to find the combined taste and skill such an order would require. But such furniture would cost a king's ransom for every piece. It might be that our buyer is purchasing on a larger scale for the vastly more numerous class who demand beauty and finish and usefulness but who do not care to pay for special designs and do not care whether what they buy was "all handmade" or not, so that it suits both their æsthetic taste and their pocket-book. In that event he would find a far larger field to choose from. Austria and Belgium, France, Great Britain and the United States would each present their offerings. Each would possess advantages over all the others, but he would find, possibly to his surprise, that distance was only a minor factor. The farthest might well be the cheapest delivered at his door in competition with the firm across the street. Were the search for the still cheaper grade that appeals not so much to the taste as to the pocket-book, although perhaps possessing its own share of beauty and comfort, the same situation would hold true with the added circumstance that here the competitor whose use of machinery is most advanced and intelligent would probably control the market.

Now the task of deciding where to place an order over so wide a field as this would be well-nigh impossible but for the assistance of such papers as THE AMERICAN EXPORTER. Their function is to *point the way* to the producers of such articles as the consumer may require. The advertising pages of THE AMERICAN EXPORTER are a series of guide posts, each directing the buyer to the place or places where he can purchase to best advantage. The readers of this paper know in a general way of the success attained by Americans in the manufacture of a great variety of articles, of labor-saving machinery, agricultural machinery and tools, furniture, boots and shoes, hardware, electrical machinery and appliances and hundreds of other lines. What they do not know is the name and address of the individual firms in these widely varied lines competent to serve them. This information our advertising pages supply, and for that reason they constitute by far the most important portion of the paper, the portion most worthy of careful perusal and study and preservation against future contingencies.

### DO ELEVATORS PAY ?

WE trust that we may be pardoned if once in a while we permit ourselves to display our amusement at some of the exhibitions of good old English conservatism that are constantly brought to our attention. No doubt we, in turn, furnish quite as much material for laughter to our British cousins as they do us, so in the end the balance is reasonably well preserved and no one is worse off. Here, then, is a delightfully grave and serious discussion of the question "Do elevators pay?" that we ran across recently in an English trade journal.

"Do elevators in city houses pay? is a question which in the hot weather is freely discussed. I am told that they do,



and that the houses who have expended money of late years in this direction have found that their customers very much appreciate the thoughtfulness which has dictated this aid to busy London life. I have not the slightest doubt that there are scores of purchasers who do not hesitate to give a distinct preference to a house where they have not much climbing to do, and I confess that I am sorry for the head of any department nowadays whose goods are on a top floor of a city house or even on a third floor, where there is no elevator."

We must confess that we are sorry, too. Already in the United States the presence of elevators in both office buildings and stores has become so universal that their absence would not only be a matter of comment, but would result in serious loss. No large office building in downtown New York could possibly hope to rent all its suites, however convenient they might be in other respects, without a perfect battery of up-to-date elevators to bring the upper floors on an equality as regards accessibility with those on the street. No store could hope for a continuance of its patronage that asked its customers to climb flight after flight of stairs in order to purchase what they might require.

At present the public in Europe and other parts of the world is not educated to understand the value of elevator service, but it is not too much to say that within ten years after the first modern battery of elevators is introduced in any city, the popular demand for similar installations wherever necessary will become too strong to be resisted. The owners of buildings extensively used by the public will be compelled in self-defense to install similar plants or forfeit vastly more than their cost in loss of rentals or patronage. The modern elevator, like the typewriter, the sewing machine and the steam engine, has come to stay and its introduction in all large business centres where buildings are over two stories in height is only a question of time.

#### SERVING MANY MASTERS.

WE have had occasion more than once to expose in the pages of THE AMERICAN EXPORTER various frauds that seek to prey either upon the American manufacturer who is enterprising enough to desire export trade or upon the foreign buyers on whose satisfaction the continuance of that trade depends. Both types are equally inimical to the prosperity of a commerce that, properly conducted, can only redound to the common benefit of all participating in it, those who buy as well as those who sell.

Of late our attention has frequently been called to the renewed activity of a class of schemers by no means new to us and doubtless altogether too familiar to more than one of our readers. We refer to the operations of certain unscrupulous agents of export commission houses in this country who go around among American manufacturers and offer to represent them abroad in connection with their regular work. They demand from each manufacturer approached a salary of some \$50 per month "to cover expenses," and usually give him to understand that he alone is to be represented in this way. As a matter of fact they get just as many into their net as they possibly can, and undertake to "represent" the most diverse and conflicting interests. In a few instances these men actually have papers to show that their house authorizes them to do this, in which case, of course, the house becomes a knowing partner in the fraud, its purpose being to have the expenses of its foreign agents, and even their salaries, paid for by the manufacturers such agents pretend to represent.

Once abroad, all pretense of representation in behalf of these subscribing manufacturers is dropped, their samples

sold for what they will bring and the agent devotes himself to the interests of his original employers. It is needless to say that such unscrupulous agents can hardly be men that the foreign buyer can trust. If they defraud the manufacturer at home by such pseudo-representation they are more than likely to defraud the buyer abroad by substitution and in other ways. No man can serve two masters. Honest men do not attempt, or pretend to attempt, to do so. The very pretense is almost proof of a fraudulent intention.

#### THE EXPORT TRADE IN AMERICAN BOOTS AND SHOES.

PERHAPS no branch of American export trade has developed under more peculiar circumstances than has the one named at the head of this article. In nearly every other branch of our exports of manufactures such progress as has been made is due, as we would naturally expect, to the energy and aggressiveness of the manufacturers concerned. With boots and shoes, however, this does not appear to have been entirely the case. The great majority of American manufacturers have been decidedly averse to entering the lists for foreign orders, preferring to devote their entire time and attention to the great home market. The reason for this was not timidity or a lack of that energy and aggressiveness that characterized their fellow manufacturers in other lines, but is found in the conditions under which the boot and shoe trade in this country developed.

In no country in the world has shoemaking machinery played so great a part as in America, the land of its invention. Shoemaking at a very early date, long before the industry had grown to anything approaching its present enormous proportions, became highly specialized. Each manufacturer made and placed upon the market a very limited number of styles and devoted all his efforts to reducing the cost and improving the quality of these. Competition developed along these lines. Successful shapes were of course imitated, but the trade steadily specialized in spite of all temptations to individual manufacturers to extend their lines. This resulted in immense economies, as can readily be seen. Instead of attempting to make a hundred styles, as is the case in England and Germany, each manufacturer contented himself with a far smaller number. In consequence, the number of cases turned out of each was vastly increased, and it became possible to keep the workmen continuously on the same operation and keep all machines running all the time, instead of having the workmen constantly dropping one part of the work to take up another, and obliging many machines to remain idle for long intervals.

Undoubtedly it was the feeling that foreign competition meant a greater diversity of styles and a resulting increase of cost that made many keen manufacturers hesitate about entering this field. Undoubtedly there were other reasons, but we are inclined to think that in general this was the most important. At present, however, whether this be given as much weight as formerly or not, there is an increasing feeling on the part of American boot and shoe manufacturers that they ought to secure more of the trade of the outside world. Great as the domestic market is our manufacturers can now more than supply it with their present facilities. Competition at home is increasingly keen. The trade is in a splendid condition, both financially—there are no stronger houses in the country than those engaged in the manufacture of boots and shoes—in point of material equipment and in experience, to meet the conditions of any competition. We believe that it is the consciousness of this, the vigorous zest "as of a strong man about to run a race," that accounts for the



present widespread interest in the possibilities of export trade that pervades the boot and shoe manufacturers of the United States.

Certainly the outlook is an encouraging one. Almost every venture, large or small, that has been made to test the adaptability of American shoes to meet the conditions of foreign competition has proved successful. And in the aggregate a very respectable trade has already been built up in this line abroad. In 1870 the exports of American boots and shoes (leather) amounted to \$419,612. In 1897 they amounted to \$1,708,224, an increase of over 300 per cent. During the fiscal year that closed June 30, 1898, they amounted to \$1,816,538, and this rate of increase has been more than maintained during the past year. The following table will be of interest as showing the destination of these exports:

Country.	June, 1897.	June, 1898.	12 months, 1897.	12 months, 1898.
United Kingdom .....	\$41,306	\$58,570	\$300,978	\$352,755
France .....	1,379	3,263	17,119	26,778
Germany .....	2,472	2,524	15,368	68,572
Other Europe.....	2,010	1,719	32,399	36,113
British North America.....	13,269	19,896	227,679	285,054
Central American States and British Honduras .....	10,601	5,851	98,678	88,907
Mexico .....	4,556	17,837	58,639	87,669
West Indies and Bermuda.....	16,555	17,991	264,878	290,516
Colombia .....	4,239	4,315	42,719	41,735
Other South America .....	1,117	2,970	26,481	28,574
British Australasia.....	48,803	30,425	403,787	235,679
Other Asia and Oceanica.....	11,886	16,008	129,955	177,418
Africa.....	6,183	13,630	87,370	93,247
Other countries.....	144	.....	2,174	3,521
Total.....	\$164,520	\$194,999	\$1,708,224	\$1,816,538

Too much credit cannot be given to the work done by the American consular representatives abroad in encouraging this trade. Consul-General Mason, of Frankfort, Germany, for example, has been untiring in his efforts to promote the introduction of American shoes into that country. The increase of over 400 per cent. in our exports to Germany in a single year is a most impressive demonstration of the soundness of his assertions that American shoes were adapted to sell in Europe.

We believe emphatically that they can be adapted to any country. No country in the world has so splendid an equipment with which to meet any conditions or any competition. With highly intelligent labor, wonderfully specialized machines and the inventive ability to modify them at an instant's notice, and with a readiness to study foreign needs and produce exactly the styles best suited to foreign requirements, there is no market in the world where foreign buyers can purchase to such advantage as in the United States.

#### PENNY POSTAGE BETWEEN THE UNITED STATES AND THE BRITISH EMPIRE.

WE understand on the highest authority that negotiations are now being carried on between the officials of the postoffice departments of the United States and Great Britain looking to the establishment of a reduced rate of ocean postage between the two countries, their colonies and dependencies. When the reduction of the postage between Great Britain and her colonies was decided upon the idea of a similar arrangement with the United States was discussed and was well received by the British authorities. In the forthcoming annual report of the Third Assistant Postmaster General of the United States there will be a recommendation that the rate of ocean letter postage between the United States and Great Britain be reduced to 2 cents a half ounce instead of 5 cents as at present. The prevailing rate for domestic letter postage in this country and also between the United States and Canada and the Republic of Mexico is 2 cents an ounce.

Thus if the proposed reduction between this country and Great Britain becomes operative two vast empires, comprising the entire English-speaking world and the colonies and dependencies controlled by English speaking peoples, will enjoy a community of postal privileges without parallel in history.

That such action coming at this time will inevitably draw the Anglo-Saxon race more closely together and furnish renewed testimony to the friendliness of the feeling that pervades the whole, forgetting past differences and ignoring present boundary lines, is clear. But aside from sentimental reasons the proposed change deserves the hearty support of all business men in every part of the English-speaking world. Trifling as the cost of a single postage stamp may be the burden of the greatly increased tariff on foreign matter is often severe and always appreciable among those whose business is largely over sea. It is quite within bounds to say that such a move as that contemplated would tend to divert a considerable volume of business each year to correspondents with whom intercourse has been thus facilitated. Both parties to the transaction would gain.

THE AMERICAN EXPORTER is heartily in favor of the change about to be officially proposed to our postal authorities and will welcome communications from its readers all over the world endorsing such action. These we shall take pleasure in bringing to the attention of the proper authorities at Washington with a view to swelling the tide of popular approval that will ultimately insure a favorable decision.

#### HINDRANCES TO AMERICAN EXPORT TRADE.

UNDER the above highly suggestive heading a recent issue of the daily publication of the United States Bureau of Foreign Commerce, containing the latest consular reports, discusses the operations of the well-known combination or ring of certain Boston and New York commission merchants who also run transportation lines (and incidentally do a publishing business), that for a long time monopolized the trade between this country and Australasia. As already announced in these columns this combination has been recently broken by the establishment of a number of rival lines. The latest of these is the Tyser line just inaugurated by an English company which already controlled lines running between London and Australasian points and now supplements this service by a direct line between New York and the same ports. It is apropos of this new line that the consular reports discuss the subject of the commission house and transportation rings. We quote from the report of the U. S. Consul at Birmingham:

I understand that these New York combination export and shipowning houses have their selling agencies so well established in Australia and New Zealand, that no individual American manufacturer or merchant desiring to sell goods in those countries can do so profitably without both selling through them and shipping goods on the sailing ships owned by them. The American manufacturer has been compelled to submit, not only to the slow time of the sailing ships, but to very high freight rates and big commissions on goods sold. It can be readily seen that to get business and perhaps ultimately to get into the combination itself, the Tyser concern must give very low rates. If American manufacturers and legitimate merchants interested in Australia and New Zealand trade would organize now, and perfect their selling arrangements in those countries, they might take advantage of the present freight fight and complete a scheme of independence by making permanent arrangements with the Tyser or some other steamship line, guaranteeing the freight carriers a reasonable profit, and securing for themselves reasonable freight rates in the future.

It is worthy of note that the new lines, which include the United States and Australasia Steamship Company, the American and Australian Steamship Line (the first) and a line between the United States and Australia operated by Messrs. Norton & Son, as well as the one above mentioned, have accomplished a great deal more than reducing freights



and replacing sailing vessels by steam. It was no doubt the greediness of the ring magnates that led to their downfall. Had they been content with the profits of a monopoly that at least gave an honest and efficient service in return for its exorbitant charges they might still be in undisputed possession of the field. The opposition lines were organized simply because their owners saw in the archaic service and huge profits of the ring an opportunity for an up-to-date line to make money. The effect that their action had upon the ring is thus graphically described by an English observer quoted in the consular report above referred to:

For years, the carrying of goods between America and Australia was done by American sailing vessels; there were no steamers in the service. These sailers were and are still in the hands of a group of New York merchants. It was often asked why there was no steamer service from New York to Australia; but these New York "broker merchants" ignored the question and stuck fast to their sailers, which, loaded at a rate of something like 30s. (\$7.29) per ton, were to them a source of considerable income. Early in the present year a London firm of shipowners decided (all honor to them) to put a steamer on the berth at New York for Australia and New Zealand, at rates which would secure them plenty of cargo. This action so annoyed the New York shipowners that they at once reduced their sailing rate very considerably and chartered a steamer to fight the one sent from England.

But the good effects of the new competition did not stop with effecting this great improvement. It makes possible for the first time in years a direct trade between the buyers of Australasia and the manufacturers of the United States unhampered by the interposition of unscrupulous middlemen. In former years the members of the shipping ring were able to keep out of the Australian market altogether those manufacturers who refused to submit to their terms. The buyers, on the other hand, were equally imposed upon by being compelled to pay enormously enhanced prices for such goods of American origin as they required. Of course, a great deal of trade was in this way lost to this country altogether and given to the more fortunate countries whose transportation lines were not so exacting.

The effect of this was precisely similar to that produced by a heavy export tariff against which manufacturers and consumers alike justly complain. The only difference was that in this case the sums exacted went directly into the pockets of the skillful operators who had succeeded in creating and maintaining a monopoly of the transportation interests. Yet, in spite of the fact that their operations were injuring American trade to the extent of millions of dollars annually, these transportation companies still demand support from American manufacturers on the ground that they are promoting American export trade. It is a satisfaction to note that the United States Government in one of its official publications characterizes these concerns as they deserve, "Hindrances to American Export Trade," and it is a pleasure to be able to felicitate American manufacturers upon the opportunity now offered to rid themselves of such hindrances once and for all time.

#### A STRIKING COMPARISON.

OUR excellent contemporary, *The Hardwareman*, of Birmingham, has two editorial paragraphs on the same column in the last number received, one of which is headed "Wonderful Growth," the other "A Declining Industry." Both describe the condition of the tinplate industry, the former referring to that of the United States and the latter to that of Great Britain. Here is the first:

**Wonderful Growth.**—Our latest exchanges bring us the statistics of tinplate production in the United States down to the end of June last, from which it appears that this seven years' old industry is still making a phenomenal progress. The American output of tin and terne plate in 1892 was, in round numbers, 40,000,000 pounds; in 1897 it had risen to nearly 575,000,000

pounds, and in the first six months of this year the production was 359,500,000 pounds, or at the rate of over seven hundred million pounds for the year. What a trade was lost there! The production of black plate has grown with even greater rapidity, from an output of 40,000,000 pounds in 1892 to 600,000,000 in 1897, and, based on the half-year's production, to over 800,000,000 in 1898. There are, we learn, now 41 active works in the United States operating 250 mills, and there are also 25 dipping works in addition. At 108 pounds to the box the above output represents a present rate of production of 7,668,000 boxes of black plate per annum and of 6,656,000 of tinplate.

The second paragraph discusses the causes of the decline in the tinplateware industry of Birmingham and South Staffordshire, only one branch of the tinplate trade of Great Britain, but still an important one. It begins by referring to a "recent wages dispute," and closes by urging that "it is not the time for employers and employed to be quarrelling."

It is not our desire in mentioning this rather striking juxtaposition to imply that we regard wages disputes as the primary cause of the decline of the tinplate industry in Great Britain. The loss of the great American market was due to other causes quite beyond the control of both masters or men at the outset. But the subsequent fall in the price of tinplate in the American market, owing to purely domestic competition, to a point that enables Americans to undersell the Welsh in Europe itself suggests that there are other causes also that must be sought. The adoption of labor-saving devices in the tinplate industry in this country has been simply phenomenal. It is owing to this factor more than all others that the present low rate of prices can be maintained. We have never heard of any corresponding improvement in the methods across the Atlantic. A few instances have come to our attention where useful inventions were proposed, but they appeared in each case to meet with the frenzied opposition of the men, and their introduction has therefore been delayed, if not always prevented altogether.

#### THE FIRST SEAPORT IN THE WORLD.

ONE of the most interesting and striking facts in connection with the rapidly increasing export trade of this country has just been brought out in the annual report of the Commissioner of Navigation at Washington. His figures prove that at the end of the current fiscal year New York will without doubt be the first seaport in the world, a position that has been held by London for centuries.

The report of the British Board of Trade shows that at London the combined entries and clearances of vessels in the foreign trade, including British colonies, for the year 1897 aggregated 15,797,659 tons, which was a gain of 215,000 tons for the twelve months. The combined entries and clearances in the foreign trade at New York for the year ending June 30, 1898, was 15,343,242 tons, an increase of 1,131,727 tons over the previous year. With the average gain for New York added to this total, the aggregate for the American port will, at the end of the current fiscal year, place New York ahead of London in the foreign commerce of the world.

The significance of this fact is increased when it is remembered that New York has for many years been falling steadily behind in relative importance as a shipping port as compared with Boston, Philadelphia, Baltimore, Newport News and New Orleans, to mention no others. While the magnitude of the traffic that passes between the fortresses that guard the magnificent harbor of New York is, and will doubtless always be, such as to retain for that city the proud title of "The Gateway to the New World" it none the less affords an inadequate conception of the vastness of the international trade entering and departing along the long coastline of the United States. There is not a people in the world



that does not share both in the prosperity that the purchases of the rich Republic bring and in that stimulated by the products of the ingenuity and skill of its artisans.

### OCTOBER EIGHTEENTH.

ON the eighteenth of last month the American flag was raised over the Government buildings in San Juan, Puerto Rico, and that country thereby became formally a part of the United States. The event was greeted with enthusiasm by the inhabitants of the island, who believed that it heralded a larger and more prosperous life for them and for their descendants. In this country and in some quarters abroad it was regarded on the one hand with satisfaction as significant of a notable national expansion, and on the other with misgiving least this seeming abandonment of the policy maintained with such success for over a century should entail some unforeseen disaster.

In reality this event, while one of the deepest interest and importance to the Puerto Ricans and well deserving to be forever celebrated by them, is in no sense unprecedented in the history of the American Republic, and therefore marks no change either for better or worse in the character of our progress and policy. It is a curious fact that October 18th, 1868, or thirty years ago, was the date on which the American flag was first raised at Sitka, Alaska, over more than half-a-million square miles of territory, at that time regarded as barren and well nigh worthless, but now, since the gold discoveries of the Klondike, known to possess untold wealth. August 12th of this year witnessed another raising of the American flag, in Honolulu, over a group of islands that for more than a quarter of a century have been steadily drifting into the Union.

Nor have these been all, or even a small part, of the occasions when the raising of the American flag has signalized a notable enlargement of our national boundaries. December 30, 1853, nearly 50,000 square miles were added to the national domain by a purchase from Mexico known as the Gadsden purchase. In August, 1848, Spain ceded the whole of Upper California and New Mexico, 545,783 square miles in all, most of which proved to be of unrivalled richness. December 29, 1845, Texas, than a Republic, was merged in the American Union with over four hundred thousand square miles of territory. July 10, 1821, the American flag replaced that of Spain at St. Augustine, Florida, signalizing an immense peaceful addition to our national domain. December 20, 1803, the flag went up at New Orleans, giving us an empire embracing the entire Mississippi Valley and more than doubling the territory over which the Stars and Stripes floated at that time. This again was acquired by peaceful purchase from Napoleon I., Emperor of France. Twelve hundred thousand square miles of almost unbroken fertility, the present grainery of the world, were acquired then, yet the date is scarcely remembered even in the great States of Arkansas, Missouri, Colorado, Iowa, Nebraska, Oregon, Washington, Montana, Idaho, North and South Dakota, Oklahoma, Minnesota, Alabama, Mississippi and Kansas, all of which were carved wholly or in great part from the territory then secured.

Clearly, the acquisition of Puerto Rico is entirely in harmony with the past history of this Republic. The triumphant march of General Miles across the island, meeting enthusiastic greetings instead of resistance, and the felicitations and speechmaking with which the flag raising of October 18th was received, were but repetitions of what happened in Honolulu, at New Orleans, at St. Augustine, and wherever the many similar events we have referred to occurred in the

past. In every instance the unfolding flag symbolized to the inhabitants the culmination of their own most ardent desires, the formal extension over them of a liberty and prosperity for which they had always longed.

May the flag in the future, as ever in the past, float over those, and only those, who come under its folds voluntarily, who will honor it and be an honor to it, and whose loyalty it can claim equally with that of the millions under it already, because it is the flag of the free.

IT is a fact worthy of consideration in connection with the apparent decline in the exports of American bicycles in 1898 as compared with 1897 that undoubtedly more bicycles were sold during the last fiscal year than ever before. The money value of these exports, which was \$7,003,323 in 1897, fell to \$6,846,529 in 1898, the falling off being almost entirely due to the sharp slump in the trade in Great Britain, our exports to nearly every other part of the world showing material gains. This difference amounts to a decline of about two per cent. in the total cash sales. But it is agreed among exporters and those interested in the trade that the prices on bicycles declined on an average nearly fifteen per cent. last year. Accordingly, it is evident that in quantity our exports a great deal more than held their own.

More than this we note the encouraging fact that in September, the last month on which we have the official figures, our exports of bicycles all but held their own, aggregating \$253,208 as against \$254,325 for the same month last year. For the coming year, notwithstanding a few sensational announcements in the daily press, we do not anticipate any material decline in prices either on high-grade wheels or on any other grade. The low-grade wheels were sold two years in considerable quantities abroad at prices that brought little profit to any one and seriously demoralized the trade. This was to a large degree stopped last year, and we believe that the coming year will see the sale of such stock discontinued altogether, and that the totals will represent almost entirely the sale of honest wheels at honest prices, which means necessarily living prices.

WHILE we have no desire to anticipate or prophesy, events have already advanced far enough to justify us in commenting on one of the results of the altered commercial conditions in the West Indies. Undoubtedly at a very early date, as soon, in fact, as Congress can pass the necessary laws, both Puerto Rico and Cuba will be freed from the restrictions heretofore imposed upon their commerce with the United States. One of the industries most directly benefited by the change will be the American boot and shoe trade, some facts regarding which appear in another column.

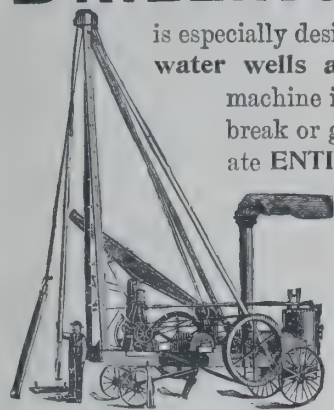
In 1896 Spain exported boots and shoes, including slippers, sandals and similar goods, to the island of Cuba to the value of \$3,663,029, and to the island of Puerto Rico to the value of \$1,125,552. The trade of this country with both islands has always been comparatively insignificant owing to the discriminating tariff. In 1896 we exported to Cuba boots and shoes to the value of \$34,992 and to Puerto Rico to the value of \$9,339, the latter figures including all other leather goods and unmanufactured leather as well. In 1892, when our trade with Cuba was very flourishing, we sold nearly \$200,000 worth of boots and shoes there, but even in that year our trade with Puerto Rico was less than \$10,000 for all classes of leather exportations.

Under the new conditions it does not seem too much to suppose that the American manufacturers will control both of these important markets.



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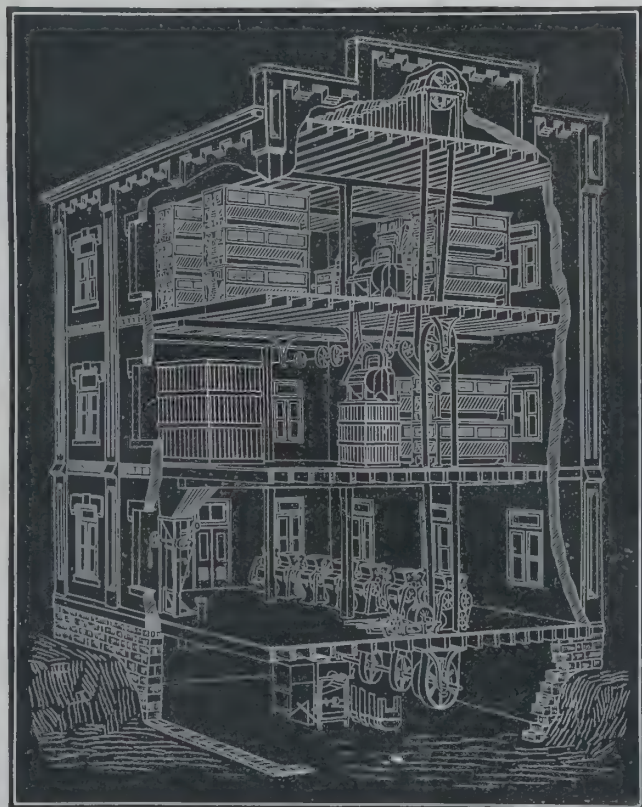
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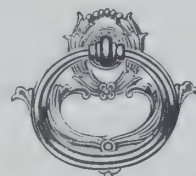
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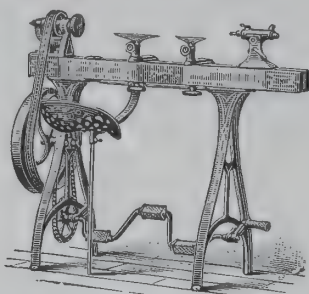
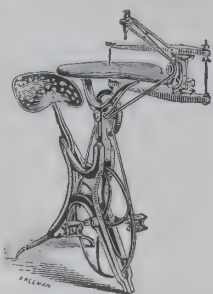
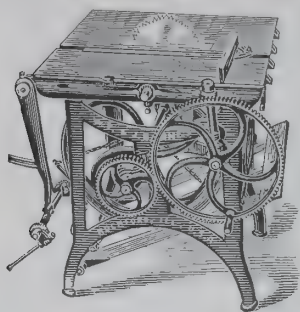


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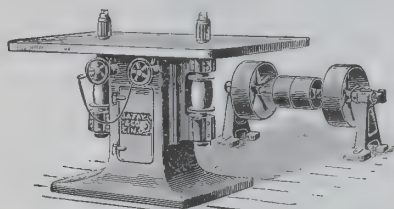
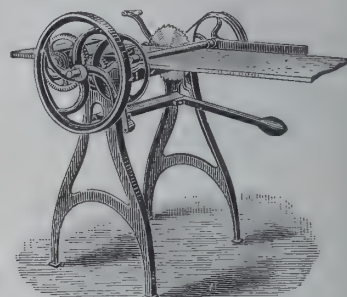
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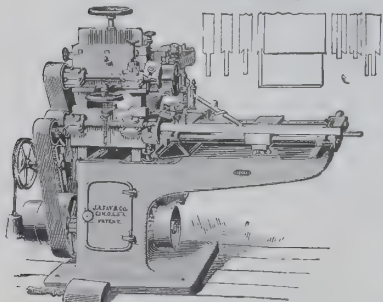
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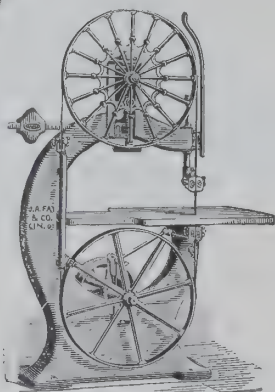
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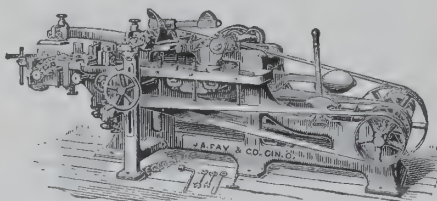
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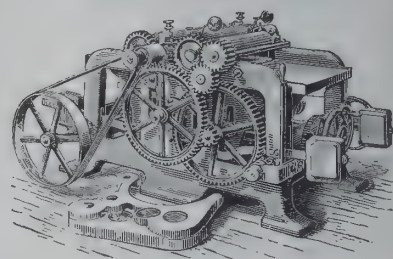
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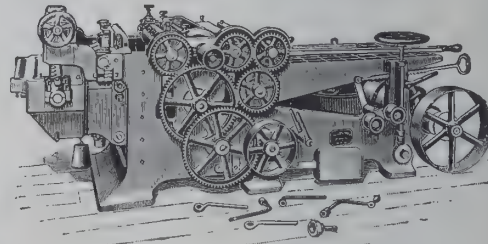
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### American Wire Nails.

THE universal demand for American wire nails is shown by the fact that they go to every grand division of the globe, and to practically every country: Germany, France, the West Indies, all the South American States, China, Japan, Asiatic Russia, British Australasia, French Oceanica, British and Portuguese Africa. In fact, it is difficult to find a spot among the civilized and semi-civilized people of the globe where this recent product of American invention and American labor does not now find a place. To the Danish West Indies the exports last year were 4,880 pounds; to Peru, 25,985 pounds; to Argentina, 268,942 pounds; to China, 9,632; to British Africa, 49,299 pounds; to British Australasia, 1,118,459 pounds, and to Japan, 4,372,292 pounds, the exports to Japan being larger than to any other country and forming in the fiscal year 1897 nearly one-half of the total exports of this article.

The Bureau of Statistics furnishes the following table, showing the number of pounds and value of the wire nails exported from the United States during the past decade:

Year.	Pounds.	Value.	Price per lb. Cents.
1889.....	1,612,576	\$157,389	9.7
1890.....	1,955,959	160,510	8.2
1891.....	1,768,483	136,858	7.2
1892.....	2,056,267	160,239	7.8
1893.....	2,300,501	158,093	6.9
1894.....	3,233,776	180,607	5.6
1895.....	4,367,267	210,192	4.8
1896.....	8,031,927	321,055	4.0
1897.....	9,941,714	357,541	3.6
1898.....	22,894,099	458,787	2.0

It will be noticed that while the quantity exported steadily increased the price has steadily decreased until now it is only a little over a fifth of what it was nine years ago. Improvements in processes and machinery have enabled our manufacturers to give the foreign buyer a constantly greater value for his money.

### American Tools and Implements in Edinburgh.

ASKED whether or not they handled American wares, one of the members of an Edinburgh wholesale firm dealing extensively in implements and sundry articles of steel, iron and wood, answered: "Oh, yes; largely. Come into our warerooms and see for yourself." Leading the way, he pointed to rows of boxes in the first room we entered, remarking: "These are American axes, the best and the cheapest in the world." Around the wall, standing ten deep, were ranged forks of all descriptions for the farmers' use, and heaped on the floor were thousands of handles for hay-forks, hoes, picks, axes, spades and shovels. Observing a notebook in my hand, he said: "If you put down everything in our place that is American, you will fill the book." This was soon apparent. Going into another room and directing my attention to shelves bending with the weight of packages and to dozens of boxes at either end, he informed me that this was a recent importation—something new for his firm—ten tons of bolts and nuts from the United States. In every part of the great establishment most of the articles were American made, including hay knives, lawn mowers, saws, files, wheels, hubs, spokes, rims, spades, shovels, rakes, washing machines, washboards and wringers. Picking up a turnip hoe, he said: "This is English. We used to get all these hoes from the United States, but the Manchester makers not long ago reduced the price, and now have the market. The barbed wire we have in stock is English, but the American wire is quite as good and as cheap. The American lawn mower is lighter and better than anything of the kind made on this side. In fact, nearly all implements produced in the United States are superior to ours, and many of them can be sold here at lower prices."

On the same street is a merchant having the largest stock of tools and mechanical novelties in the city. Here I found American-made augur bits, angular bitstocks, bench screws, hand stops and vises, bicycle wrenches,

hones, brackets, breast drills, expansive bits, block planes, bull-nose planes, carpet stretchers, saws of all kinds, glass-cutters, hammers, hatchets, hand beaders, hand drills, lathe chucks, oilstones, plane irons, ratchet braces, ratchet screwdrivers, spiral screwdrivers, shears, iron spoke shaves, squares, tool handles, wing compasses, chisels, etc. American tools are preferred by workmen to either English or German. They are tempered harder, are more serviceable, and have a finish that is lacking in the others. Tools of German make are somewhat cheaper, but are softer, and do not stand use as well as the American. Moreover, dealers in all sorts of goods frankly say that there is just now a lively prejudice here against anything German.—*Report of the U. S. Consul at Edinburgh.*

### American Machinists' Nomenclature.

THERE are, perhaps, few except those who have had much translating of technical literature from English into foreign languages, or similar work, who have any idea of how many absolutely meaningless names we have drawn from the animal kingdom, and which very seldom can be rendered in their technical sense by their actual equivalent.

Thus, the machinist employs a "dog" on his lathe; he takes a "hog" cut, if the tool will stand it; the castings are made from "pigs" of iron, which in turn were fed from a "sow." Work is set upon a "horse" or "buck," and punched or bent by a convenient "bear"; screws are turned by a "monkey" wrench. [This, however, got its name from the inventor, Thomas Monkey, of Bordentown, N. J.] Hoisting is done by a "crab," and a convenient "cat" is a part of the outfit of a shop "crane," and a "kit" of tools is ever at hand. A "crow" helps to straighten work, a "jack" to lift it, a "mule" pulley aids in driving machinery and a "donkey" engine turns. A "fish" connects parts end to end, or strengthens a broken beam; "shells" are used all over; a "worm" does powerful but quiet work. A "cock" shuts off the water; one kind of a "ram" raises it and another does heavy work. A printing press has a "fly"; the first locomotives had a "grass-hopper" valve motion and drive, and "butterfly" valves are common. "Herringbone" gears are used by the best builders; "turtles" fit printing press cylinders, and "fly" wheels are running all over the world. In drilling even an "old man" is called into service, and "doctors" prevent faulty lathe work.

But from the human body itself we borrow the name of nearly every principal part, as head, neck and chest; arm, leg and toe; heel, sole and foot; elbow, shoulder, wrist and knee; knuckle and finger; rib and diaphragm; eye, ear, nose and cheek; mouth, tongue and tooth; throat and gullet; back, side and belly. From the minor animals, also, we get snout and horn, tail and claw, wing and feather, quill and spur, fin and scale.

### Increasing Use of Structural Steel.

THE daily press has recently noted the fact that steel is now being used not only in the great business buildings which crowd our large cities, but it is being put in structures of smaller dimensions. A Philadelphia paper, in a recent issue, stated that there is now in course of construction near that city a splendid country seat, which is remarkable for its size, location and architectural beauty, and especially notable from the fact that it is being built of iron and steel beams, such as are used in the immense business structures of the period.

The fact is that structural steel, such as beams and angles, is already being used in buildings of far less cost than "splendid country seats." The ordinary stone front found in the residence portion of the average city now requires steel, and the smaller business houses are being constructed largely of that material. Prices of structural steel have been cut down materially within the last few years; consequently its use must extend. As sheet metal has in the construction of factory buildings displaced wood, so will steel beams be used in place of the more cumbersome timber. Moreover, the cost of heavy timber must increase, while the cost of steel will grow less. Long before the present structural shapes of steel were known to the building trade steel rails were used for beams in many cases. It must be admitted that steel, even when unprotected, is as good a fire-resisting material as wood; and steel will each year encroach more and more upon the lumber trade. The time has hardly arrived when it can be used in the construction of small dwellings; but that time is fast approaching, and it is being hurried by the fire regulations in many cities. With improvements in turning out small structural shapes, the use of steel in the construction of small buildings will increase, and the next few years will undoubtedly see important changes in that line.—*Journal of Building.*



The Two Fastest Long-Distance Runs Without Stop.

IN the last number of THE AMERICAN EXPORTER we gave some details regarding the two famous express engines, one American, the other English, that share between them the honor of the longest distance runs attempted by modern express engines. As the matter is one of unusual interest we here amplify the preceding account. The following details are taken from the *Scientific American*:

What gave the Empire State Express its world-wide celebrity was its high average speed, the great distances (nearly 1,000 miles) over which this speed was maintained, and the great distances covered by the train between stops—the first stage of the journey, New York to Albany, 142.88 miles, at the rate of 53.58 miles per hour, being by far the longest scheduled run without stop ever attempted. It was natural that the remarkable work done by the New York Central should stimulate engineers in the home of the “fast express,” and of late years there has been a gradual raising of the speed of a few crack trains on leading English roads. The fastest long-distance run without a stop in Great Britain is now made on the Great Western Railway, the first section of the Cornish Express covering the distance from London to Exeter, 193.92 miles, at the rate of 53.36 miles per hour.

There is a popular impression that these crack expresses are extremely light trains, hauled by powerful locomotives, and that their running cannot therefore be taken as representative performances. That this is a great error the following data regarding the Empire State Express will show:

The regular train consists of four cars weighing 376,000 pounds; but it frequently happens that the heavy special car of the vice-president, weighing 110,000 pounds, is coupled on, and as the schedule time is kept with this load, we feel justified in including it in this discussion of maximum performances. The train is thus made up as follows:

	Pounds.
Buffet car.....	94,000
Day coach.....	82,000
“.....	97,000
Drawing-room car.....	103,000
Special car.....	110,000
Total.....	486,000

The cars are 70 feet in length over all. They are carried on six-wheeled trucks, and have the vestibule connection, additional steadiness being secured by a system of hydraulic buffers, which hold the cars closely together and greatly reduce the sway on curves at high speed. The riding of the cars, we can state from experience, leaves nothing to be desired, even on the sharpest curves and at the maximum speeds.

The trains are hauled by a class of 4-coupled 8-wheeled locomotives, of which No. 999 is the best-known example. The later locomotives of this class differ chiefly from No. 999 in having drivers 6½ instead of 7 feet in diameter, and slightly less heating surface. The dimensions of No. 999 are as follows: Cylinders, 19 by 24 inches; diameter of drivers, 86½ inches; weight on drivers, 84,000 pounds; total weight, 124,000 pounds; heating surface, 1,930 square feet; steam pressure, 190 pounds. There are no features in which it departs materially from the lines of a typical American 8-wheeler, and it would be difficult to find a class of engines that better represents the standard express locomotive practice of the present day in this country. The engines are good steamers and economical coal burners. Our English friends will be surprised to learn that careful tests by Mr. Buchanan, the master mechanic, show that the coal consumption when hauling the Empire State Express is 38.3 pounds per mile for No. 999 and 33.47 pounds for the 871 class with smaller drivers.

The Cornish Relief, as the first section of the Cornish Express is called, is run just ahead of the regular train, and its length and weight vary according to the demands of the traffic. During July of last year the train frequently consisted of seven or eight cars. The heaviest train ever hauled by a single engine consisted of eight cars of the 2-truck 8-wheeled type, whose weight was as follows:

	Pounds.
Composite car, weight.....	46,116
“ “ “.....	55,216
“ “ “.....	55,496
“ “ “.....	52,360
“ “ “.....	54,768
Third class car, “.....	45,892
“ “ “.....	44,800
“ “ “.....	45,696
Total.....	400,344

The cars are narrower, shorter (50 to 55 feet), and not so lofty as those of the American type. In their general arrangements they might be called modified American cars, and they embody several characteristic features of each type. Many of them contain a corridor leading from one end of the car to the other down one side of the car, the compartments opening into the corridor in the same way as do the drawing-rooms on a Pullman car. They are provided with lavatories and many of the best features of our own system.

Like No. 999 of the New York Central, the English engine “Worcester” is an excellent representative of up-to-date practice in that country. It embodies the distinctive features of inside connected cylinders (the latter being located side by side within the frames and beneath the smokebox) and a single pair of driving wheels. The cylinders are 19 inches diameter by 24 inches stroke, and the drivers are 7 feet 8 inches in diameter. The weight on the trucks is 39,872 pounds, on the drivers 29,984 pounds, and on the trailing wheels 27,664 pounds, the total weight of the engine being 107,520 pounds. The boiler carries the copper firebox, which is usual in English practice; the total heating surface is 1,467 square feet and the working pressure is 160 pounds to the square inch. The coal consumption worked out at 29 pounds per mile for the whole trip. The New York Central train is considerably heavier, the road is more full of curvature, and the train is handicapped at the outset by having to run at greatly reduced speed for the first ten miles. On the other hand the Great Western run is one-third longer, and the hills which have to be climbed add greatly to the difficulty of maintaining a high average speed. In speed the Empire State Express is a shade the faster.

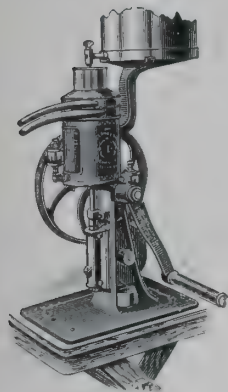
Cuba and the American Vulcan.

AMERICAN iron and steel and the manufactures thereof are among the potential factors of national prosperity. In the development of home industries they are vital factors, and in forecasting the future of our foreign trade they are neither obscure nor indefinite. They have already secured recognition in every accessible market, and in the form of pig iron, steel bars, nails, wire, rails, hardware and machinery have been exported to a value running up into the twoscore millions. Europe, Australia, Africa, Mexico, Canada, India, Japan, Russia and the Pan-American countries have been large consumers of our iron and steel products. This trade has been secured in the face of many disadvantages and of severe competition. In cost and quality there has been no demurrage, and the fact is established that the American product can be placed with a fair fighting chance in nearly every foreign market with but little risk of backsliding. In contending for these markets we are not facing pigmies, but Titans. England, Germany, France and Belgium are no adolescents or juveniles in this business. They are practical, hardheaded and able, and are not lacking in energy, enterprise and pertinacity. The iron and steel supremacy of any one nation will be a matter of the survival of the fittest. Resources of raw material, economy of assemblage and production, and facilities of rapid and cheap transportation are the decisive factors of ultimate leadership. Supremacy swings on this pivot. It is the good fortune of the United States to be superabundantly rich in its iron ore resources and in nearly every other kind of raw material essential to the manufacture of the finished product. In the North as in the South the same conditions prevail. There is no bottom to the cellar either of coal or iron and in some instances the obtainance of each is at a lower cost than elsewhere. In the transportation of raw material the wider the radius of distribution the added percentage of cost, and when competition sharpens the edge of profits, the question of cents decides the commercial advantage. In this connection the iron ores of Cuba cannot fail to be of importance to the makers of iron and steel on the seaboard nearest the point of supply. Cheap water transportation at works on the Atlantic coast places the rich Cuban ores at a minimum of cost at the wharves of Philadelphia and at Sparrow’s Point, Baltimore. The steel in which these ores are a factor is of excellent quality, as the steel plates on some of our warships testify.

In the year 1897 some 300,000 tons and more were shipped from Cuba to the United States at the average cost of \$1.21 a ton. The deposits in the Santiago region are said to be enormous, and it is not improbable that more of it and other ores are to be found in the so-called Pearl of the Antilles. Be that as it may, the Cuban iron ore in sight is of such quality and in such quantities as to make it of immense value to some of our iron and steel plants, and as an auxiliary to our fighting strength in the invasion of foreign markets it is of more importance than is generally supposed.—*The Age of Steel.*



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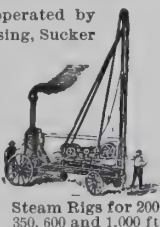
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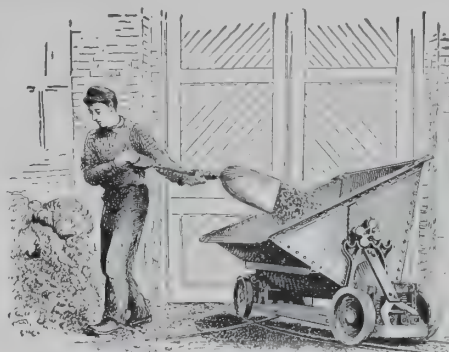
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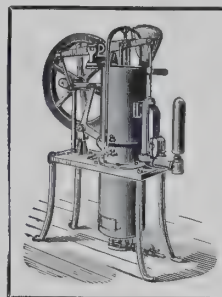
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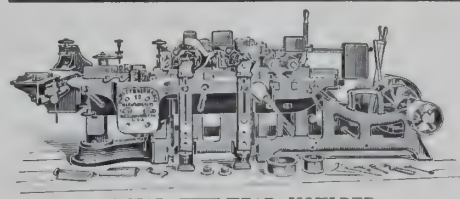
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### Space Granted to the United States at the Paris Exposition.

THE United States will have 210,000 square feet of floor space at the Paris Exposition. J. H. McGibbon, Director of Exhibits, Chicago, has received word from Commissioner Peck, at Paris, saying that he had secured 35,800 square feet additional to what was obtained by Major Handy. This does not include the ground for a Government building, space for an agricultural pavilion, in which agricultural implements will be installed and a fully completed railway train in full operation. Mr. McGibbon thinks it is probable that Commissioner Peck has also secured space in which to install the furniture exhibit. It is said that the American exhibits will be placed with those of England, Germany and Russia. The division of floor space will be about as follows: Educational department, sciences and arts, 12,000 square feet; general machinery and electricity, 59,000 square feet; transportation and civil engineering, 20,000 square feet; agriculture and food products, 24,000 square feet; horticulture, 4,000 square feet; forestry, chase and fisheries, 4,000 square feet; mines and mining, 8,700 square feet; general manufactures, 57,000 square feet; army and navy, 6,000 square feet; chemical industries, 5,000 square feet; social economy, 2,200 square feet; fine arts, 10,000 square feet. Applications for exhibition room are coming in rapidly, and Mr. McGibbon stated that they were from the largest manufacturing concerns in the country.

### Coal Mining Machines.

THE development of the use of mining machines in the bituminous coal mines of the United States in the last few years has led Mr. E. W. Parker, of the U. S. Geological Survey, to present some interesting statistics in his annual report on the coal production of the United States. The reports for 1897 show that mining machines were in use in twenty States as compared with sixteen in 1896 and eight in 1891. Utah and Washington, which had a machine-mined tonnage of 760 and 3,920 respectively in 1896, did not report any product as won in 1897, while six States which did not report any coal won by machines in 1891 to 1896 has a combined machine-mined product of nearly 2,000,000 short tons in 1897. These States, with the amount of coal extracted by machines, were as follows: Alabama, 294,384 short tons; Kansas, 4,500 short tons; Kentucky, 1,299,436 short tons; Tennessee, 47,207 short tons; Texas, 11,750 short tons, and Virginia, 323,649 short tons.

The number of firms using machines has increased from 51 in 1891 to 136 in 1896 and 211 in 1897. The number of machines in use has increased from 545 in 1891 to 1,446 in 1896 and 1,988 in 1897. The amount of coal won by machines has increased from 6,211,732 short tons in 1891 to 16,424,932 in 1896, and 22,649,220 short tons in 1897. The most significant increase shown by these statistics, however, is in the percentage of machine-mined coal to the total product. In 1891 the proportion of the total product won by machine was 5.56 per cent., in 1896 12.56 per cent. and in 1897 16.17 per cent., nearly three times the percentage won in 1891. These increases are rendered all the more significant when the total tonnage in the States included in this tabulation is considered in comparison with the machine-mined product. The total product of the twenty-two States in 1891 was 111,772,588 short tons, and in 1897 the product of the same States was 140,037,905 short tons, showing an increase of 28,265,317 short tons. The product won by machines has increased from 6,211,732 short tons to 22,649,220 short tons, a gain of 16,437,488 short tons, or 265 per cent.

With the exception of Utah and Washington all the States had a larger product from machines in 1897 than in 1896, and in one other case, Indiana, was the percentage of machine product to the total less in 1897 than in 1896. Practically all of the coal mined in Alaska is extracted by machines, giving that territory a percentage of 100. Montana's machine-mined coal was 43.78 per cent. of the total in 1897, against 37.54 per cent. in 1896. Of Kentucky's product in 1897 36.07 per cent. was mined by machines. These two States represent the most important development in machine mining as compared to the total production. Pennsylvania, the largest producer, has also the largest machine tonnage, but the latter was only 12.29 per cent. of the total product of the State in 1896 and 16.35 per cent. in 1897. Illinois comes second, both in total output and machine product, the latter being a little over 19.5 per cent. of the output of the State in each year. Ohio, fourth in production, is third in the amount of coal mined by machines—her machine-won product in 1897 being within 3 per cent. of that of Illinois. West Virginia, the third State in the amount of production, has a comparatively unimportant machine product.

The remarkable increase in the production of coal by the use of machines, superseding a large amount of manual labor and cheapening production, has undoubtedly had an important bearing on the prices of bituminous coal which have declined steadily for several years. In some cases selling prices have been lowered on account of the lessened cost of production; in other cases machines have been introduced in order to meet reduced prices caused by an already glutted market. In nearly all cases the benefit that might have been derived from the introduction of machines has been sacrificed in the effort to increase the output rather than to continue the previous output with a shortened pay roll.

There has been installed since 1880 a total of 3,872 mining machines in the coal mines of the United States. The returns from the operators show that 1,988 machines were in operation during 1897, so that there were approximately 1,874 mining machines which have been discarded, or were not in actual use, during 1897. Probably not more than half of these have been discarded, from which it is shown that about 75 per cent. of all the mining machines installed since their use was begun are still in operation or available. It should be remembered that these statistics apply only to undercutting machines driven by electricity or compressed air. They in no way refer to generators, haulage locomotives or drills for blasting.

### American Iron and Steel in Great Britain.

SOME good British authorities are inclined to view the competition of American iron and steel with composure, and rather deprecate the disturbance of a part of the trade over the new development. While they look upon the United States as the great producer of the future, and anticipate a steady increase of our exports, they believe that this growth will not seriously injure British trade. They point out that the world's consumption of iron, and especially of steel, has increased rapidly during recent years, and is now undoubtedly very close to the production. The reserve stocks are diminishing rather than increasing. Now Germany, though her iron production is steadily growing, does not increase very fast, chiefly because she cannot do so without depending on foreign ores, which the German ironmasters do not like. France and Belgium are at their upper limit of output. Under these circumstances, should an increase in production be called for the United States would be the only country in a condition to respond at short notice. Our fuel and ore reserves are large enough to permit a great expansion, and we can make iron and steel at a lower cost than any other country.

This is a sensible view of the matter, and approaches the truth very closely. The demand for iron and steel will probably be large all over the world for some years to come, and it is to the world's advantage, as well as our own, that we can furnish a large share of the supplies.—*The Engineering and Mining Journal*.

### Notable Increase in American Shipbuilding.

THE following table gives the total number and tonnage of merchant vessels of over 100 tons under construction in the eleven named countries in September, as compared with the same period of last year:

Country.	No.	Sept., 1898. Tons.	Sept., 1897. Tons.
Great Britain .....	54	175,814	145,436
Germany.....	45	144,105	80,488
France.....	25	75,432	52,089
United States .....	50	58,545	9,800
Italy.....	17	40,984	28,590
Norway.....	26	27,810	14,626
Holland.....	22	20,223	57,585
Denmark.....	15	12,570	10,305
Japan.....	3	10,000	3,300
Austro-Hungary .....	9	9,540	700
Belgium.....	1	4,000	....
Totals .....	267	579,023	372,919

It is interesting to note that in this comparison the United States has risen from ninth to fourth place in a single year, although the present figures are far from satisfactory. We believe that the next few years will see a vast increase in the American merchant marine, particularly in that portion of it engaged in foreign trade.

*Modern Mexico* states that St. Louis shoe houses have recently received orders aggregating over \$25,000 from the city of Mexico.





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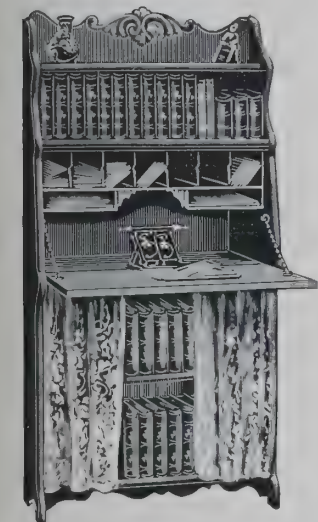
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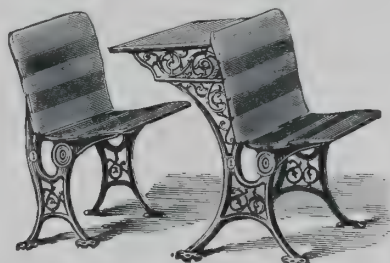
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THE STEEL-ENCASED TUB has an outside construction like the Enamelite, finished in two delicate shades of green enamel, with gilt decorations. The copper lining has a highly polished tinned surface. The overflow on both tubs is brass nickel-plated.

Enamelite, with overflow, 4½ ft., \$8.75; 5 ft., \$9.25; 5½ ft., \$10.00; 6 ft., \$11.00.

Steel encased, copper lined, with overflow, 4½ ft., \$10.50; 5 ft., \$11.00; 5½ ft., \$11.75; 6 ft., \$12.75.

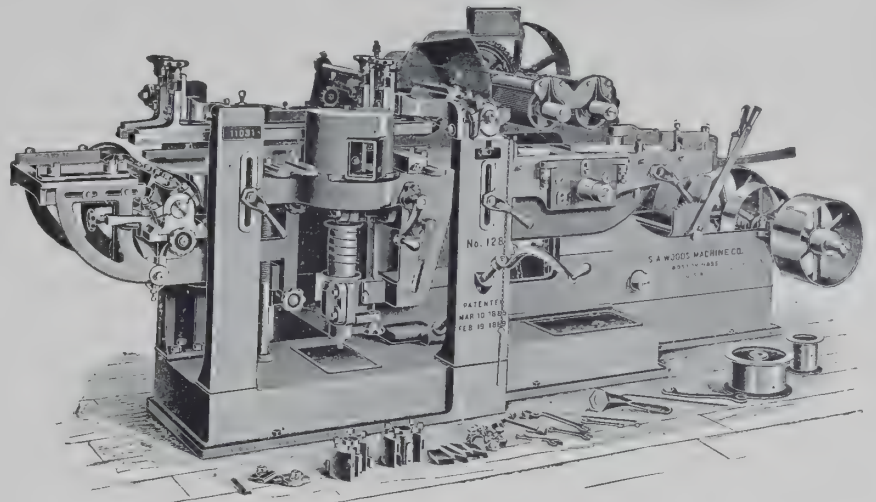
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REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.

MILLS EDWARD Master Schooner "Florence Shay."



### Features of the New Battleships.

SECRETARY LONG recently published a circular which defines the characteristics of the three seagoing coast-line battleships authorized by the new Naval Appropriation Law. It is proposed that the new ships shall have a load water line of 368 feet; the breadth at water line will be 42 feet; and the mean draft at the normal displacement 23½ feet; the normal displacement is to be 11,500 tons and the total coal capacity 1,200 tons. The hull is to be of steel, with a double bottom, and is to be subdivided by watertight compartments. The hull at the water line is to be protected by an armor belt of a maximum thickness of not less than 16½ inches and a mean depth of 7 feet 6 inches. This belt is to extend at least from the stem to the after barrette and to maintain the maximum thickness through the engine and boiler spaces. From the boiler space forward it may be tapered to a uniform thickness of 4 inches. The transverse armor just forward of the boiler space and at the after end of the belt will not be less than 12 inches in thickness. Throughout the length of the vessel a protective deck is to extend. Where this deck is worked flat the total thickness will not be less than 2¾ inches, and where worked with inclined sides the slope will be 3 inches in thickness forward and 5 inches in thickness aft. A cellulose belt is to be fitted along the sides for the whole length of the ship. The barbettes for the 13-inch guns will have armor 15 inches thick, except in the rear, where it will be reduced to 10 inches. The turret armor is to be 14 inches throughout. The ship's sides, from the armor belt to the main deck, will be protected by not less than 5½ inches of steel armor from barrette to barrette. Coal is to be carried back of a portion of this 5½-inch casing armor.

In a suitable position will be a conning tower of not less than 10 inches in thickness, having an armored communication tube 7 inches in thickness. Four 13-inch guns will be mounted in two heavy barrette turrets on the mid-ship line, one forward and one aft. There will be ten 6-inch rapid-fire guns in broadside on the main deck, four on the upper deck within the superstructure, and a secondary battery of twenty-four rapid-fire and machine guns. The 6-inch guns on the upper deck will be protected by 5½-inch armor. There will be two submerged torpedo tubes. The torpedo compartment will be fitted up for the storage of eight 17-foot torpedoes and appliances and means for operating and handling the same.

The vessels will be driven by twin screws. The engines will be of the vertical triple-expansion four-cylinder type, two in number, one on each shaft, and they will be placed in separate watertight compartments. The eight boilers are to be cylindrical and single ended. They are to be placed in four separate watertight compartments, and will work at a pressure of 210 pounds. If on trial the average speed shall equal or exceed the speed at sea of 16 knots an hour for four consecutive hours, the vessel will be accepted as far as the speed is concerned. If the speed falls below 16 knots and exceeds 15 knots an hour, the vessel will be accepted at a reduced price, the reduction being at the rate of \$25,000 per quarter knot if the deficiency of the speed lies between 16 knots and 15½ knots, and at the rate of \$50,000 per quarter knot between 15½ knots and 15 knots. If the speed falls below 15 knots an hour the vessel will be rejected or accepted at a reduced price. No sail will be carried, but two military masts are to be fitted with fighting tops.

### A Decade's Growth.

THE Treasury Department at Washington has just received from the British Government a statistical abstract giving the exports and imports of twenty-two of the leading countries of the world. The tremendous strides which the United States is making in its exports is nowhere more strikingly shown than in this publication, notwithstanding the fact that it only covers the period 1886 to 1896, since which time our most rapid advances have been made.

An examination of the export figures shows that the total exports of the twenty-two countries in question amounted in 1886 to £1,157,000,000, and in 1896 to £1,387,916,000, an increase of 20 per cent. in the decade, while the figures for the United States alone show an increase of over 30 per cent. in the decade. Germany's increase in exports in the decade 1886-96 was 13 per cent., that of France but 4½ per cent. and that of the United Kingdom 10½ per cent.

That our share in the total commerce of the world is steadily increasing is shown both by the figures presented by the publication in question and a comparison with those of earlier compilations. Our share of the total exports of the twenty-two countries under consideration in 1886 was less than 12 per

cent. and is now over 13 per cent. Adding to the total of the countries covered by the publication in question the latest accessible figures on the commerce of the other countries of the world it is found that the exports of the world are about \$8,500,000,000, and the total commerce (exports and imports) approximately \$17,000,000,000. Of this vast sum the United States contributed \$1,847,531,984 in 1898, or in round numbers 11 per cent., against estimates of 9½ per cent. in 1889, 7½ per cent. in 1870 and 5.4 per cent. in 1830. As the year 1896 was the first of these remarkable years in the history of American export trade it is probable that the favorable showing above indicated has been still further improved, our exports for 1897 and again for 1898 surpassing all previous records.

### English and American Machines in Germany.

ENGLAND has a large export trade in machinery with the German Empire, more than half of the machines sent going into the textile mills. In 1897 machinery to the value of £1,809,871 (\$8,807,737) was received from England. Of this £216,759 (\$1,054,858) were for steam engines, £913,270 (\$4,444,428) for textile machines, £310,996 (\$1,513,462) for agricultural machines, and £173,218 (\$842,965) for sewing machines. Up to last year the imports constantly increased. The eight months ending August, 1898, show a falling off. This is due to Germany's increased capacity to furnish her own needs, and to the rapidly gaining American competition. The United States is sending large quantities of machinery to Europe, particularly to this Empire. If its capacity to compete with England and Germany continues to increase, it must soon hold the upper hand in these markets. In the eight months ending August 31, 1898, England sent 28,287 tons, against 29,719 tons in 1897; the United States sent 16,190 tons in 1898 and 9,240 tons in 1897. Thus United States exports to the German Empire, which were only 30 per cent. as large as England's in 1897, were 60 per cent. in 1898.

### The Out-of-Date Machine.

MACHINERY in many of our industries is the potential of success. There was a time when its importance was not so vital. Small plants and workshops were more numerous. Business was divided and scattered, and the individual who made castings or horseshoes, built wagons or wheelbarrows, and by hammer, saw or lathe fashioned out his articles in wood or iron knew but little, and, as a rule, cared less for concerted action as to prices and processes. The public bought on much the same plan, and if what was wanted could be obtained at a reasonable price and in a fair degree of excellence or quality it paid the bill and asked no questions. Time, however, has wrought a great change in these conditions. The smaller shop and the old machine are becoming archaic. We are winding up the loose and one-time straggling threads on large reels. The concentration of industries has become an economic necessity. Men bunch their energies and enterprises. Capital is being centralized or focused, and production to be profitable in the great race for business has to leap to the whip and the spur. The turn out and the turn over are becoming equivalents. Hence our huge factories and plants. The larger the apple the more the cider, and the more centralized our industries the more our millionaires.

In this recasting of the industrial system the machine is boss and it too has to keep pace with the times, and sometimes a shade of difference as to its efficiency can make one manufacturer rich and another poor. Improvements are continuous and invention never sleeps, and it has become one of the graver and more serious concerns of business to keep track of its machinery. In some cases, and probably in a great many, a manufacturer is financially unable to be constantly replenishing his plant with improved apparatus, but in other cases it may be simply a shortsighted dislike to change that is accountable for otherwise mysterious leakages in business. This is true in mills, factories and railways where there is an engine waste in fuel, a shrinkage in the transmission of power, a necessity of employing two machines where one of a better class would suffice, or in the loss of by-products that might be commercially profitable.

It is probably one of the secrets of American prosperity that the newer and better types of machinery are being used with a freedom unknown elsewhere. In some of the older countries of Europe where changes are not so easily made as here the manufacturers are practically handicapped in the competition that is giving American trade the edge of a razor. It is all in evidence, however, of the fact—as true in home trade as in international business—that the man and the machine must keep in line with the times or take a place at the rear end of the procession.—*The Age of Steel.*



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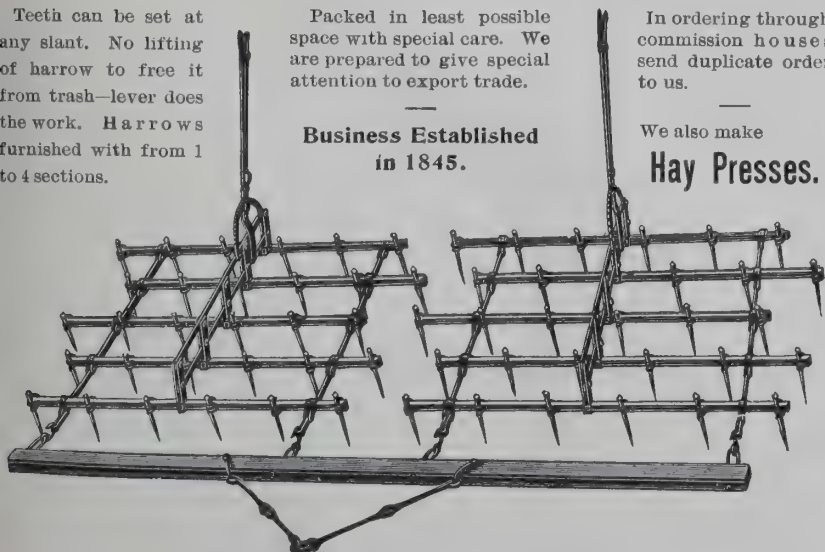
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EMPTY SPACE.Our new Knock-down, galvanized iron ice  
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303.	Army and Navy.....	2.40 28.80
	All linen; for Clubs.	
89.	Treasury.....	3.00 36.00
	Finest linen; for Clubs and particular players.	
39.	Trophy Whist, French size, 2¼ x 3½.....	2.00 24.00
	Fine finish; large indexes; new brand.	
93.	Ivory Whist, German size, 2¼ x 3¾.....	2.00 24.00
155.	Tourists, hard finish; for general stores.....	.70 8.40
145.	Texan, enameled; for general stores.....	.90 10.80

## "National" Playing Cards.

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75.	National Club, regular size, 2½ x 3½, finest Club Cards.....	2.50 30.00

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### A German Opinion of American Shoes.

**M**R. FRANK H. MASON, the United States Consul-General at Frankfort, Germany, some time ago received a very interesting letter from a prominent shoe merchant of Berlin, portions of which will be of especial interest to the readers of THE AMERICAN EXPORTER at the present time:

"After having visited and personally examined, during a period of several months last year, a number of the largest shoe manufacturing establishments in the United States, I decided to purchase and import for my own long-established trade, which is located in the busiest quarter of Berlin, a trial stock of several thousand marks' worth of American shoes. As I had foreseen, these have been promptly sold, down to the last pair; indeed, it soon became quite evident that my customers had already a decided preference for American shoes.

"That American shoes by reason of their extreme elegance of form and perfection of finish, as well as their superior cheapness in comparison with German-made shoes, would find an extensive, profitable sale in Germany there can be no reasonable doubt.

"After the highly successful experiment above described, I have repeatedly ordered further supplies of American shoes, and my own opinion as an experienced merchant, sustained by the uniform verdict of my customers, is that these shoes, in respect to durability, elegance of style and excellence of material, have demonstrated that the standard American manufacturers can be safely advised to offer their products on a large scale in Germany. This opinion is in no wise impaired or controverted by the fact that certain other shoe dealers who have not had, like myself, an opportunity to actually sell American shoes to their customers, have given hastily formed and unfavorable opinions of such goods, for no better reason, apparently, than because they were not of German origin.

"I can, therefore, only repeat and emphasize that my customers, who are of the most cultivated and intelligent class, have constantly and unanimously expressed to me their entire satisfaction with American shoes; and this fully justified the conclusion that such goods will have a great future in Germany if only American manufacturers will organize their export trade to this country under proper conditions and push it with intelligent energy."

### Shoe Trade in the Philippines.

**T**HERE would not appear, at first sight, to be much opportunity for a boot and shoe and leather trade in the Philippines. Yet the amount of business in these goods is considerable, and they are a factor in the export trade of the chief countries of Europe.

According to all accounts the retail business in shoes is conducted on exceedingly profitable lines in these islands. The quality of the goods is as inferior as the cost of them is high. For example, a "shoe"—that is, a slipper—made at Palma de Mayorca, Spain, of inferior goods for colonial wear sells for \$4.50, Mexican, at Manila, while the same goods are sold in Cuba and Puerto Rico at from \$2 to \$2.50, Mexican. A couple of years ago a store was opened in Manila expressly for the sale of these slippers. A Frenchman who was familiar with the prices in the Spanish West Indies asked the proprietor why he charged such an excessive price for such inferior goods, and the reply he received was that "Europeans who go to the Philippines went there to make a fortune, and not for their health or to enjoy the beauty of the landscape."

Owing to the inferior quality of the shoes worn by all classes in the Philippines the consumption is very much larger than in general elsewhere. The trade appears to be divided into two grades. The better qualities are sold in the hat stores, which make shoes a side line, as it were, and the inferior goods are found in the native and Chinese stores. The better qualities—a poor quality at that—are imported from France, Germany and England, while the cheaper grades are, or were, supplied by Spain or made in the islands. The native wear, known by the name of "Chinelas," a slipper without a heel, are made in very large quantities by the Chinese. The material used is partly imported leather of the cheapest kind and partly leather tanned in the islands. Low-cut shoes are in most favor, and the Chinese shoemakers make large numbers of these on European models for the resident European trade. They also make sandal-slippers, or alpargatas, for the native population in general in large quantities.

The Manila-made shoes, though seemingly well made, give absolutely no wear. The quality of the imported goods is so inferior and the dealers combine in charging what is really such an exorbitant price for an execrable

quality of goods, that the subject of footwear furnishes a standing grievance to the Europeans and Filipinos alike.

There would thus appear to be an opportunity for introducing shoes and slippers suited to the requirements of the country, strong, yet light, reasonably cheap, and, for native uses, much the same kind of shoe or slipper as is used in Cuba and Puerto Rico. Manufacturers might find it worth while to look into this matter, as the joint consumption of the former Spanish West Indies and the Philippines is very large.

With free entry to her goods and a high tariff and various sundry penalties, taxes and restrictions operating against the trade of other nations, Spain, of course, furnished most of the boots and shoes imported into the islands. The value of the leather-made goods of every kind bought from Spain during 1896 was a little over \$200,000. The larger part of this amount was for shoes and sandals. France furnished about 12,000 pairs of boots and shoes, and about 28,000 pounds of leather; Germany, 40,000 pairs of boots and shoes and about 55,000 pounds of leather and leather goods; while Great Britain supplied about 115,000 pounds of various leather-made goods. During the same year the United States did a little business with the islands, contributing \$215 worth of enamelled leather, \$1,100 worth of upper leather, \$5,750 worth of sole leather, \$725 worth of other kinds of leather, and \$87 worth of harness and saddlery.

The upraising of a trade in American boots and shoes and leather goods generally in the Philippines would mean the inauguration of greater commerce than would appear. Situated so favorably to the Asiatic markets, in some of which, especially Asiatic Russia, the East Indies and China, American leather-made goods are just securing a foothold, Manila would be an advantageous point whence to extend trade. Hong Kong is only 630 miles distant. Siam and Korea, both expanding countries, and the markets of the Singapore, Yokohama and Java are within a radius of 1,500 miles. The Far East is destined to become a customer of considerable importance to the leather trade, and attention bestowed on commercial movements in that part of the globe will not be idle.—*The Boots and Shoes Weekly*.

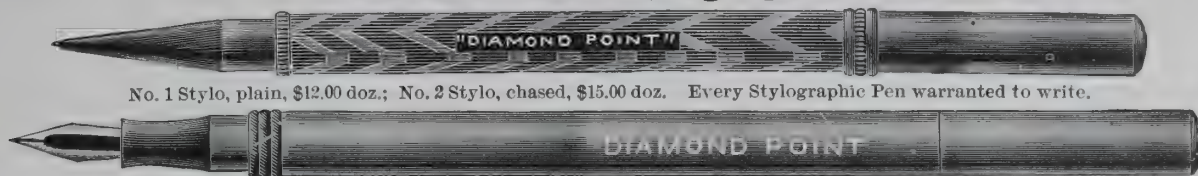
### Trade Unionism and the Decline of England's Foreign Trade.

**T**HE London *Iron and Coal Trades Review* has this severe indictment of trades unionism in connection with the falling off in English exports. "Line upon line, and precept upon precept, the testimony against the trade unions of this country is being heaped up by those who can speak from experience. And a sorry record it is! After pointing out that of the many causes which militate considerably against England's ability to cope with the daily increasing demand for cheap goods, perhaps one of the most serious is the dictative position assumed by trades unions and men's associations—which hold immense power in the fixing of rates of wages for certain operations, and insist upon the methods of production of certain articles—a recent writer proceeds to say that his own firm is trying to wrest from the Americans an article which some years ago was sold all over South America of English make, but which now has been superseded by a new model made in the United States of America. The writer procured patterns, prices and orders. The matter was thoroughly gone into, but it was impossible to place the orders, as home prices were 30 per cent. to 50 per cent. dearer than American. A careful inquiry elicited the fact that the American article was economically made by machinery, and the English manufacturer, although possessing the necessary plant, was forbidden by the union governing his trade to use it in the production of an article hitherto made solely by hand labor."

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A dispatch from Santiago de Cuba says that General Wood has granted a franchise for an electric road from that city to the cemetery and to El Caney. It is hardly expected to pay its expenses for the first three years.



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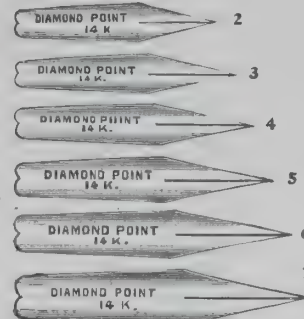
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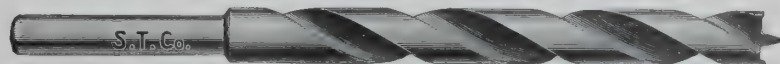
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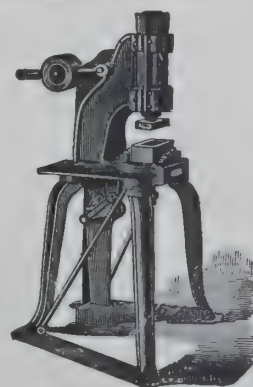
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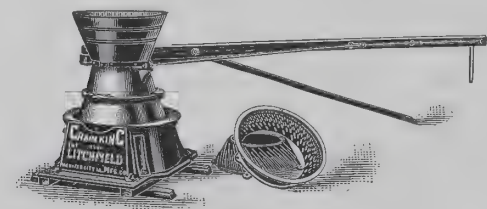


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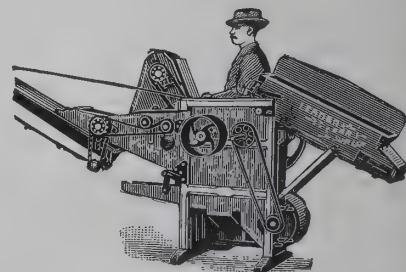
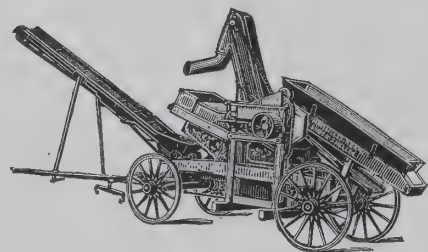


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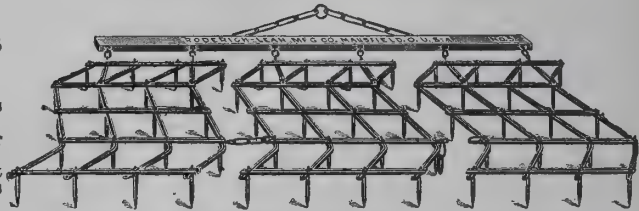
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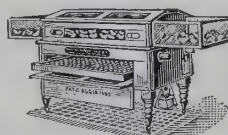
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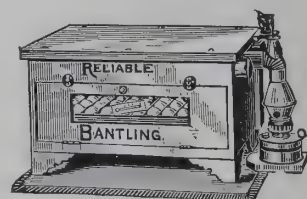


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### A Progressive American Industry.

THE development of the packing and slaughtering industry in the United States in the last quarter of a century and the various changes which have come about in those industries as well as in others allied to them, are often a source of wonderment to the close observer. Coincident with this phenomenal advance in the methods of preparing meats, progress is also to be recorded in the treatment of hides, bones, hoofs, fat, grease, glue, blood, entrails, etc., etc.

In the olden time these adjuncts to the slaughter-house were primarily worth as much as they are now and in some instances a great deal more, but they received little or no attention, being regarded as mere accessories to the production of meat and to be subsequently sold for what they might bring in the same way that we might sell old iron to-day. Perhaps this remark applies less to hides than to any of the other articles we have named, but even in the matter of hides a wonderful change for the better is to be recorded.

In the old-fashioned days of slaughtering, hides were taken off without any care or without any regard as to their subsequent value, as a commercial commodity in the market. Cuts and "scores" were the rule rather than the exception and the result was that dealers or tanners bought hides "flat." In other words, they "bought a pig in a bag," took the good with the bad and paid a uniform price. The crossroads slaughterer still does his business in this way, but as a general rule the whole system is changed. A bullock or a calf is "stripped" or "dressed" with every regard for the value of the hide and the result is that this important branch of the business is now much more profitable.

In the utilization and treatment of the other products named, the advance from the period of unknown crudities to merchantable commodities has been exceedingly rapid and interesting. The laboratory and science have played no small part in the evolution, nor can it be said that the end is yet in sight. Hardly a year passes but some new discovery is made in the great packing-houses and some new use found for apparently insignificant refuse. It has been pointed out by a Washington correspondent in this connection that one of the industries which have developed in huge proportions in the last third of a century is the manufacture of commercial fertilizers, a growth which has kept pace with that in the slaughtering industry. The annual production of fertilizers now reaches in value about \$40,000,000, and the business is increasing rapidly. A great many of the best chemists in Europe and America are devoting their lives to the study of the subject and to devising combinations to cheapen and improve fertilizers.

Farmers have become so well advised as to the kind of fertilizers needed for various soils that they cannot be imposed on as formerly. They know what they want as well as the manufacturers or the agents, and if the suitable goods are not offered they make no purchases or else go further until they can find what is best adapted to their use. Super-phosphates, potash salts, nitrate and ammonia salts, industrial by-products, such as tankage, dried blood, cottonseed meal, etc., are the principal elements from which the standard fertilizers are compounded. Production of fertilizers has been greatly cheapened of late and as the goods are reduced in price the market for them broadens. An experienced manufacturer makes the prediction that within ten years the production will aggregate \$100,000,000 annually.

Of course fertilizers when marketed for the farm are only in part made up of blood, tankage, etc., these being from the slaughter-house, but they are elemental factors and very important items in this great fertilizer industry.—*The National Provisioner.*

### American Windmills in South Africa.

A LARGE number of windmills of American manufacture have already been introduced into South Africa, according to a report from Consul-General J. G. Stowe, at Cape Town. As they are entered at the custom house under the head of agricultural implements it is not possible to give the

number or value. Suffice to say that a demand for this class of goods will soon be in evidence, as the different governments of South Africa are making ready, after many experiments, to present bills to the legislative bodies for the establishment of various systems of irrigation.

Well drills have been introduced, but not in sufficient numbers to meet the demand. South Africa is to a very large extent an arid country. It has its wet and dry seasons, although enough rain falls during the wet season, if it were conserved, for irrigation purposes. A scheme is on foot to grant to parties drilling wells a certain bonus from the government, in addition to the charge for the work, to be paid by the land owner, provided the well produces water.

### American Condensed Milk.

ALTHOUGH, compared with the consumption of fresh milk, the use of the condensed product cuts a comparatively small figure, there is, nevertheless, a large and growing demand for it both at home and abroad. The export trade has increased during the last few years from a few hundreds of cases a year to many thousands. Japan, China, the Sandwich Islands and India are large consumers of American condensed milk, and the capacity of the plants is taxed to fill large orders from the East.

The home consumption of condensed milk, it is estimated, takes more than half the entire production, which is roughly calculated to be from 1,500,000 to 2,000,000 cases every year. There are twenty concerns in various parts of the country with factories located in the milk-producing sections.

These concerns manufacture by far the largest portion of the entire output of condensed milk. The principal plants are located in the middle West and in New York State, and the milk supply is drawn from every State east of the Mississippi River and north of Maryland. While the largest consumption of fresh milk takes place in the Summer season, there is also a greater production then, and the portion unconsumed is turned into the condensers, where it is preserved.

Absolutely pure milk only is fit for manufacture into the condensed form. Milk tainted or adulterated is not fit for condensing. The manufacturers insist that their suppliers observe all rules and hygienic precautions that will insure the best results. Skimmed milk is never used, and Spring milk, owing to the fact that it is weaker in fats, is not condensed except when supplies are low. The richest milk will keep after condensation from six to eight months in a temperate climate. The process of condensation consists in evaporating all the water from the crude product. This leaves the essence of the milk, to which is added the best sugar, the exact proportion varying in the different factories from one-twelfth to one-sixteenth. The sugar is the great preservative, and constitutes the commonest objection to its use. If it is properly prepared, condensed milk is more economical than the fresh product, and among the poor of large cities, where facilities for keeping fresh milk for even a few hours are not at hand, condensed milk is an inestimable boon. Among the poor people in all large cities the consumption of condensed milk is in excess of the fresh.

Three pints of milk after the water has been taken from it will make one pint of the condensed product. This is sterilized under pressure at a great heat, and after being sweetened is cooled and poured into the cans, which are then sealed and packed away in cases ready for distribution. The industry was started about thirty years ago in this country, and it has been a successful and growing business ever since. In Europe the production of condensed milk is larger than it is here, the product being in better demand.

**Sir Thomas Lipton on American Meat Refrigeration and Transportation.**—Sir Thomas Lipton, in a letter to the *National Provisioner*, writing under date of September 17, from London, England, says: "There is no place in the world where the preservation of meat is so scientifically handled as in America. Very great expense, thought and care have been applied in ascertaining the best and most effective means and methods of preservation; and from the time the animal is killed until its delivery—no matter whether in the States or in England—it is watched with the greatest possible care, and the temperature of the chambers on the journey—wherever they may be—is continually noted and regulated for the safety of the meat. Frequently, however, after it leaves the responsibility of the packer, it is stupidly exposed and handled by inexperienced persons, with the result that the packer is wrongfully blamed for the meat arriving in bad condition. I cannot see how the packers could improve on their present system of transport of fresh meat."



### American Agricultural Machinery and Implements in Denmark.

THE agricultural machinery imported into Denmark every year is valued at about \$600,000, and it is estimated that about one-third of these goods are originally of American make. One of the principal dealers in these goods in Copenhagen says that knife harrows have been a success, but spade harrows and spring-prong harrows have been excluded from the market by a Swedish imitation at less price. The American steel plow (mild centre steel) has won a great reputation, both on account of the convenient shape of the moldboard and curve of the beam and the excellent quality. Over 700 are sold in Denmark yearly. Light hand-chopping implements have also had a large sale, and the imitations have not so far been successful.

United States self-binders, mowers and reapers have won a great reputation in Denmark. Self-binders will hardly become an important article in the trade, partly owing to the high cost of the binding yarn and partly to the variable weather that is usual at harvest time. On the other hand, American mowers and reapers will probably command large sales for many years to come. American threshers are not suited to the market of Denmark, but horse rakes have a large sale. There is a good opening for potato diggers, which are little known, and small hand-sowers are also in demand. The horse-power sowers are not adapted to the country.

### German Agrarianism and Its Result.

THE meat difficulties which now exist in Germany, and which, according to some reports, have resulted in horses, dogs and cats being cut up for human consumption, are the best evidence of the unjust position which that country has assumed in relation to American meat products. Apropos of this, and as proof of the extent and deep-rooted character of this Agrarian anti-American feeling, United States Consul J. C. Monaghan, at Chemnitz, quotes the following letter from one Max Patzer:

"The undersigned party carries on a dairy in Zwickau, together with the sale of Mohr's products. I am obliged, under contract with Mr. A. L. Mohr, Bahrenfeld, to sell his oleomargarine, as well as his meats, which are of American origin, and which are inspected at Hamburg by a sworn inspector. After being found faultless, the shipment is sealed and a certificate enclosed. The city of Zwickau passed a resolution, sanctioned by the Government of the Kingdom of Saxony, that no meats shall be admitted for sale, except it can be proved that the animal was inspected before and after killing and found healthy. The inspection must be done by a German veterinary surgeon, and the animal must be killed in Germany. Not being able to prove this, all my goods have been seized and will be sold at auction in the slaughterhouse as inferior goods. I have protested against the measure, and the affair is now before the district authorities. I have fully informed the firm of A. L. Mohr. They want me to have the affair settled by a lawsuit. Mr. Mohr also writes that, according to the treaty between the United States and Germany, the imports of meats is free; further, he advises me to refer the matter to the United States consulate and humbly ask for interference and protection, which I hereby do. Any further information respecting this matter will be gladly given."

The fact that in the face of such opposition as this, imports of American meat products into Germany are *nine times greater* than a year ago, is proof that the German working people do not favor a policy that was framed solely in the interests of the rich landowners. The demand of the laboring classes everywhere is for cheap and wholesome foods. These American supplies and no amount of misrepresentation can alter or conceal that fact.

### A Prophecy That Is Likely of Fulfillment.

"THERE is a great opportunity before the manufacturers of this country in the production of shoes for the European countries, particularly in England and Australia," remarked a shoe manufacturer to *Boots and Shoes Weekly*. "The people in those countries are apparently becoming alive to the importance of stylish footwear. They are patterning Americans in every way possible, and the result is manufacturers in those countries are becoming alarmed at the manner in which American-made shoes are interesting the people. Several American manufacturers have taken hold of the subject in earnest, and already a number of retail establishments handling American-made shoes exclusively have been established. There is a great field to develop, and it is my intention to branch out just as soon as I can make arrangements to send my goods across the water. Here is a letter I just received from a large retail establishment in Australia asking for samples of the various lines that I manufacture. I am going to attend to the request, which may possibly be the opening wedge to a good business with this house. You see, they state that they are of the opinion that they can use considerable of our goods, providing they suit. Then, again, in my opinion, our newly acquired territory, Puerto Rico and also Cuba, opens up a

field that will result in a large business being conducted by shoe producers in this new territory. It may take some time before the inhabitants will become Americanized, but that such a thing will happen is without question. The Puerto Ricans and Cubans are naturally proud people, and it is fair to assume that they will become more careful in regard to their dress under the new order of things. I confidently expect that our foreign shoe trade will result in a big boom before another year has passed."

### Wood Mantels.

MANTELS nowadays are almost exclusively made of wood. Marble is used occasionally, but only for the most costly of all mantels, costing perhaps thousands of dollars. The marble mantel of the kind so familiar years ago is no longer made, and sometimes marble mantels of fine quality that cost from \$200 to \$300 are taken out to be replaced with mantels of woods, costing perhaps \$100. Slate mantels, so widely and commonly used a few years ago, are now rarely set up. They also have given place to wood.

Wood mantels may easily be costly. As the story is told in the *New York Sun*, they are made in hundreds of different styles and at all sorts of prices, from \$1,000 down to a few dollars. Many of them are beautiful, not a few of them are of great beauty, and even the cheapest may be tasteful and graceful in design and finish. There never was a time when so much art and skill went into wood mantels as now.

The woods used include mahogany, curly birch, quartered oak and other hardwoods, whitewood and pine. Perhaps more are made of whitewood than of any other one material. The various woods are finished in great variety. The oaks, for instance, are stained in seventy or eighty different shades, to match, if it should be desired, any furniture. Many mantels are painted and enamelled. In the fireplace fittings of the more costly mantels it is not unusual to find marble or onyx matching the wood in color, with the result of producing a beautiful harmony in effect.

In styles, wood mantels are made in colonial, Elizabethan, empire, classical, renaissance and other designs, colonial being most in demand now. Some colonial mantels are copies of mantels in old and, perhaps, familiar houses. While mantels in hundreds of styles are to be found already designed, many are made to order from architects' designs for single houses. It is not unusual to make mantels to order to match furniture; it might be that a mantel would be made to match a bureau or dining-room table. New styles of mantels are constantly being added to the great number regularly produced.

The more costly wood mantels may be massive in proportions, and of fine woods, and elaborately hand-carved, or if not of great size they may be of fine woods and elaborate in detail of construction and finish; but beautiful mantels can be bought for less than \$100 of fine woods, and of imposing proportions if that is desired. It is probable that the large majority of the mantels in natural woods now set up in houses cost less than \$100, perhaps considerably less; handsome mantels can be bought, indeed, for much less.

Tile mantels are made in a variety of styles, such mantels and fireplaces being set when used principally in halls and libraries; occasionally a tile mantel is placed in a dining-room.

**The Sale of Farm Scales.**—In many parts of the world there is a steady growth in the sale of farm scales. The price of a first-class set of scales suitable for weighing grain and stock is now so low as to be within the reach of nearly every farmer. The sale of scales to farmers rightfully belongs to the implement dealers, as they are certainly to be classed under the head of farm implements. Comparatively few dealers, however, have taken the proper interest in the subject. In the United States special canvassers solicit orders from the farmers, sometimes for scalemakers and sometimes on their own account. Perhaps the profits available to the dealer are not sufficiently attractive, but the matter will bear investigation. If the profits are large enough to cover the work necessary dealers and importers will do well to see what they can do. No one company has a monopoly of this business either here or abroad, and this line should furnish a substantial profit to those who undertake to push it properly.

**American Implements in Australia.**—Papers received from Australia give full accounts of the great annual show of the Royal Agricultural Society of Victoria, held at Melbourne the first week of September. American farm machinery and implements were well represented and attracted general attention and were highly praised.



# MOLINE PLOW COMPANY,

MOLINE, ILLINOIS, U. S. A.

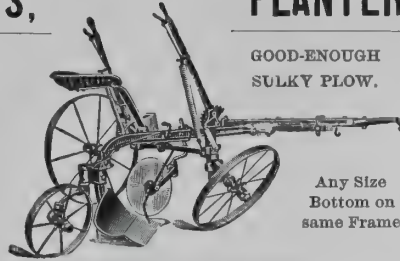
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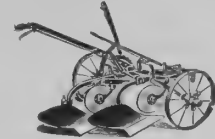


Moline Champion  
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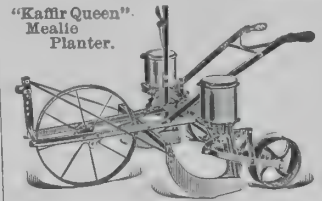


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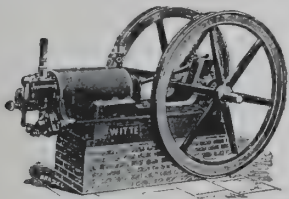
"Kaffir Queen".  
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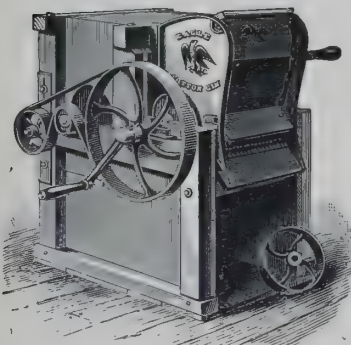
Built in Parts like a Steam Engine.

Fully warranted. No risk. Up to date. Economical on water and fuel. Catalogue J.

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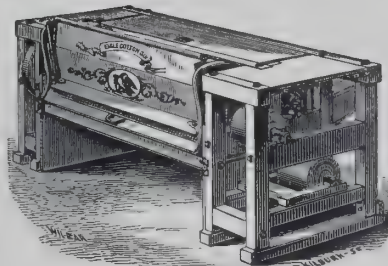
Will run in any place or altitude.  
With the electric igniter we can use  
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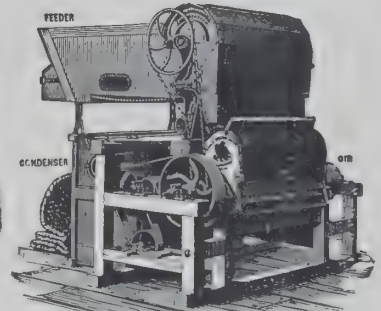


These Gins enjoy a BETTER REPUTATION THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are PREFERRED to all others made, on account of their STRENGTH, SIMPLICITY, DURABILITY, the amount and EXCELLENCE of the work they accomplish, and the RAPIDITY of their operation.

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Power Gin with 12-inch Saws.



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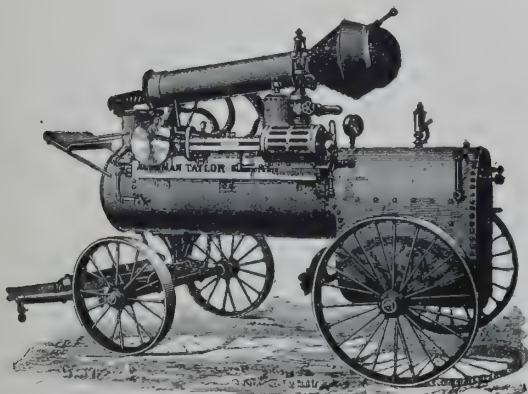
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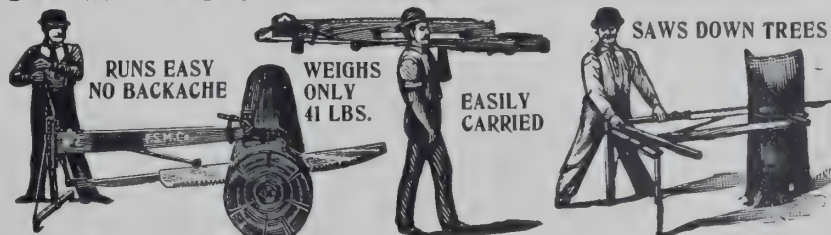
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One No. 1 machine	.....	\$15 00 each; Gross Weight, 84 lbs.; Measurement, 5' 9" x 0' 10" x 0' 10"
One-half doz. No. 1 machines	.....	13 00 " " " 370 " " 5' 9" x 2' 6" x 1' 0"
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### EXPORT NOTES.

The American soft felt hat is all the rage in the leading Australian colonies.

The Pittsburg Reduction Company has received an order for 50,000 pounds of aluminum from the Russian Government.

American electrical firms have an order to furnish 100 tramcars and the machinery for the power plant for an electric railway in Bristol, England.

The Jewell Belting Company, of Hartford, Conn., has recently made a large shipment of leather belting to the Hankow shops of the Siberian Railway.

The Carnegie Steel Company has recently shipped 4,716 tons of armor plate for the Russian Government, together with a considerable quantity of rails for the Trans-Siberian Railway.

The Newton Machine Tool Works, of Philadelphia, has just received the contract from John Brown, of Sheffield, England, a large manufacturer of armor plate, for a special double radial drilling machine for drilling armor plate.

The Monarch Rubber Company, St. Louis, Mo., recently filled an order for 135 mackintoshes and five cases of Hood rubber boots, to be shipped to Santiago de Cuba. They believe this to be the first bill of American rubber goods going to Cuba under new conditions.

A large order on South African account for one and two row corn planters has recently been placed with the Eureka Mower Company, Utica, New York, U. S. A. Large orders for reapers have been placed with Messrs. Adrance, Platt & Co., Poughkeepsie, New York, U. S. A., by South African clients.

The Water Pipes Committee of the Glasgow Corporation having received the refusal of McLaren & Co. of that city to supply the larger portion of the material required, has definitely decided to accept the offer of R. D. Wood & Co., of Philadelphia, as we intimated in a former number would probably be the case.

The Government of Victoria has placed an order for six Thompson recording wattmeters of 100 volts and varying capacity with a well-known American firm. They will be deposited in the Electrical Bureau of Victoria, and will be used as the official standard by which all electric meters in the colony will be tested.—*Engineering* (London).

The St. Joseph Pump and Manufacturing Company, of St. Joseph, Mo., reports that it has recently shipped a number of its "Perfection" pumps to Bilbao, Spain, and that orders are now on file for shipments to Cape Colony, South Africa, and Copenhagen, Denmark. This pump we note received a gold medal at the Trans-Mississippi Exposition just closed.

The Fitchburg Machine Works, Fitchburg, Mass., was successful in securing the contract for the small lathes to be installed in the new Usines-Clement in France, a reference to which appeared in our last number. In all, the Fitchburg company is to make forty-two machines. These, they inform us, will be of two types, their 14-inch Gem lathe and their 40-inch Horizontal Boring and Drilling Machine.

The Vilter Manufacturing Company, Milwaukee, Wis., recently sent us a long list of recent contracts taken by them for their refrigerating and ice-making machinery. Of those taken abroad we notice Cerveceria de Torreon, Torreon, Mexico, one 20-ton refrigerating machine; Cerveceria Central, City of Mexico, one 25-ton refrigerating plant, and one 5-ton ice tank; Cerveceria Moctezuma, Orizaba, Mexico, one 5-ton ice tank, besides several orders from Canada.

Mexico is taking from the United States some good consignments of machinery, notably equipments for sugar mills and textile plants, which involve the installation of steam engines, boilers and pumps and wood-working apparatus. The demand for iron-working tools is also increasing, the various railroads which are making extensions having found it necessary to enlarge their car shops. A number of new foundries in the republic are as well adding to the demand for tools.

The E. W. Bliss Company, Brooklyn, N. Y., manufacturers of metal pressing and stamping machinery report that their export trade has increased recently over 100 per cent. The countries from which the best demand has been received have included France, Switzerland, Holland, Belgium and Great Britain. Germany does not appear to have been prominent as a purchaser, although, as is well known, the foreign demand for American machine tools is very largely from that country. In spite of the cessation of

hostilities, the department of the E. W. Bliss Company's shops in which the Whitehead torpedoes are constructed is still actively at work for the United States Government.

The superiority of American-made machinery is becoming generally acknowledged in Denmark. Heretofore the Germans have controlled the market in this line, but now, according to our vice-consul at Copenhagen, "the Danes want American-made engine lathes, drilling and boring machines; milling, planing, and shaping machines, slotting machines, boring and turning mills, radial drilling machines, machines for making screws, punching and shearing machinery, grinding and polishing machines, bolt cutters, and American tools of all kinds."

### American Anthracite Coal for English Markets.

THE Anthracite Coal Operatives' Association of the State of Pennsylvania are at present taking steps to extend their foreign markets, and have sent their secretary on a mission to Europe in order to find out what prospect there is of opening up a demand for American anthracite in the London market. The production of Pennsylvania anthracite, which last year amounted to over 52,000,000 net tons, has not been so steady of late years, and the association believes that a considerable part of the product could be sold in Europe. The average value of the anthracite at the mines is estimated at about 6s. 8d. per ton, while the average value of the bituminous coal product of the United States in 1897 was only about 8s. 4½d. per ton. Anthracite, therefore, is a much dearer fuel, but it is more economical for household use, and gives a brighter flame without smoke. It is the fuel chiefly used in New York and has much to do with the clear and comparatively smokeless atmosphere of that city. It is believed that, shipped to England on a large scale, anthracite coal could be sold at about 17s. in the Thames, which may give it a chance when its qualities are fully recognized. Its smokelessness is of importance to a city like London, if consumers generally could be made to view matters from the high grounds of public interest and convenience.—*Iron and Coal Trades Review*, London.

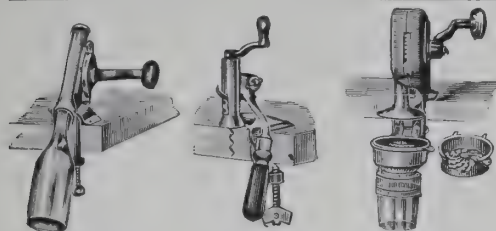
### American Wire Nails in Europe.

IN an article on the manufacture of nails, after showing to what extent wire nails have been substituted for cut nails, the *British Iron and Coal Trades Review* says that "figures published from time to time make it clear that the United States threatens Europe with serious competition in the nail trade, despite the fact that it is a highly finished product as ironworks' products go, and involves the employment of a large amount of skilled labor. At the average wholesale price of \$1.08 per keg of 100 pounds, the United States appears to be prepared to sell cut nails at works for about \$23, or about £4.15, per ton—little more than the British price for steel rails. This, moreover," adds the *Review*, "is not the price for export purposes alone, but the average American price for all purposes for a whole year. We have never heard of any price approaching these figures being quoted in Europe. British nail manufacturers would be likely to find it worth their while to ascertain how it is done, compatibly with the payment of the higher range of wages common to all American industries."

**Important American Concession in China.**—An American syndicate made up of a group of our leading capitalists has secured a concession at Peking to construct a railroad running from Hankow to Canton and the sea. It will pass through one of the most densely populated regions of the empire. The contract with the Chinese Government calls for the expenditure of about \$40,000,000, to be supplied by the syndicate to the powers that be, and to be secured by five per cent. bonds covering a period of 50 years. The first party of engineers have been sent to survey the proposed road route, and three years from the time the survey is approved by the Chinese Government the railroad is to be completed. The material of construction is to be supplied by both Great Britain and America.

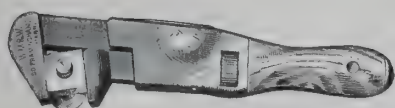
**Vancouver-Vladivostock Steamship Service.**—Commercial Agent Beutelspacher, writing from Moncton, under date of October 19, 1898, notes that the Canadian Pacific Railway is to place a line of steamships on the Pacific Ocean between Vancouver and Vladivostock. The Trans-Siberian Railway, adds Mr. Beutelspacher, will open an immense territory with abundant resources. Canadian manufacturers are hoping to obtain a share in the trade of the East.



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Cork Puller.28. Samson  
Cork Puller.42. Quick and Easy  
Lemon Squeezer.45. Acme  
Lemon Squeezer.48½. Quick and Easy  
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Cork Screw.Clock movement. Cuts at  
touch of cigar.59. Safety Automatic  
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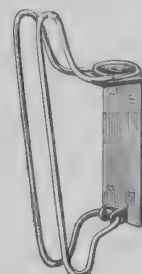
ALL STYLES AND SIZES.

NASHUA SADDLERY HARDWARE COMPANY, - Nashua, N. H., U. S. A.

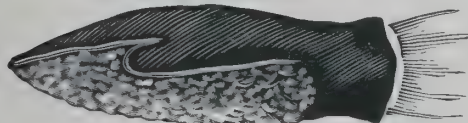
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Brass and Iron Wire Cloth,  
Bank and Office Railings,  
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every description.The Snow Bicycle Holdersused in all Bicycle Stores, Public Buildings, Business  
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ESTABLISHED 1834.

They  
Adjust  
to any  
angle,  
but  
when  
set are  
firm.

THE HANDY.



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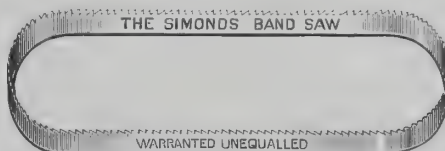
## SHEEP SKIN MITTEN,

Acknowledged to be the best article for **POLISHING STOVES**, as it does away with the old-time  
dirtiness of the work, making this work a pleasure. Also invaluable for polishing brass or glass, or  
silverware which it does not scratch. For tan shoes and cleaning bicycles it has demonstrated itself  
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Machine  
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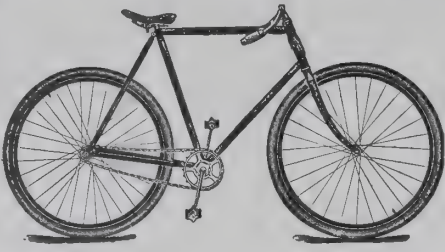
FACILITIES: The most improved machinery, artistic designers, skilled workmen.

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—the go-lightly kind.

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**WE GUARANTEE FOR 1899**

a wheel which, in mechanical accuracy and detail, strength, beauty and finish, is as nearly perfect as a bicycle can possibly be made.

FLOOR SPACE, 5½ ACRES.  
CAPITAL INVESTED, \$800,000.  
ESTABLISHED 1869.

6,000 IMPERIALS EXPORTED IN 1897. THEY ARE THE MOST RELIABLE AND BEST SELLING WHEELS MADE.

**FRAMES** Made of the highest quality of steel tubing. This tubing is made especially for us and is used in Imperials only.

**BEARINGS** Disk adjusting. Made from best tool steel. Scientifically tempered and carefully ground to remove any roughness caused by tempering.

**HUBS** Hubs are machined from solid steel bar. The large or barrel pattern is used, thus allowing the use of large balls. The balls are kept in place by ball retainers which, in connection with felt washers, act as dust shields, making it almost impossible for dust or grit to enter and prevent the free running of the balls. The oil cups in the hubs are placed in the center, the oil being conveyed to the bearings by a tubular brass sleeve, by which a minimum quantity of oil will be distributed equally to the bearings on either side.

**CHAIN** The mechanism most essential to an easy-running bicycle is the chain. We use on Imperials a chain of a superior make—one that is fully up to the high standard of the Imperial. Chain pins are hardened; centers are also hardened and drawn. Sides milled so as to make a perfectly smooth and frictionless connection with the sprocket teeth.

**GUARDS** Wood or steel. All machines for women fitted with guard on rear wheel and chain.

**HANDLE BAR** Steel; adjustable. Almost any angle can be obtained by adjusting stem clamp, which is made with a steel drop-forged corrugated head.

**RIMS** Regularly fitted with wood rims. Plain steel rims can be furnished.

**TIRES** All Imperials are regularly fitted with tires that cement to the rims, such as Morgan & Wright double tube or Hartford 77 single tube. Other tires can be furnished at actual extra cost to us, such as American Dunlop detachable or G. & J. detachable.

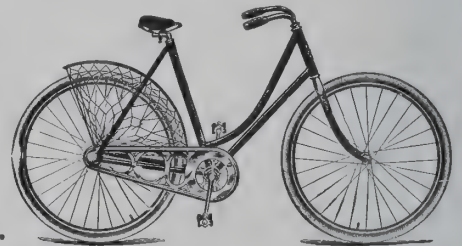
**CRANKS** Standard length, 6½ inches. 7-inch can be furnished.

**GEAR** All sprockets detachable. Sizes for men—20, 22, 24 or 26 tooth front; 8, 9 or 10 tooth rear. Sprockets for women—20 or 22 tooth front; 8 or 9 tooth rear.

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**FINISH** Black, maroon or green, striped and decorated.

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	PRICE		PRICE
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are known the world over for their excellent finish and reliable quality.

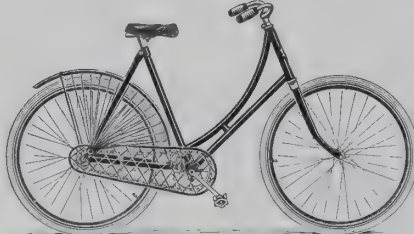
Write for export prices. We deliver our machines properly boxed, freight prepaid, to New York City.



Tribune Model 33. Price, \$50.00.

Model 33 is a bicycle of excellent quality and finish, and far superior to many machines listing at higher price. The frame is weldless steel tubing of best quality, built in two heights, 23 and 25 inches; wheels, 28 inches diameter; gear, 73; cranks, 7 inches. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, gold striped, nickel trimming. Weight, about 23½ lbs.

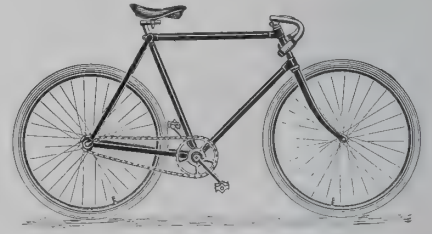
ARENA MODEL M. Built very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 34. Price, \$50.00.

Model 34 is practically the same as Model 33, excepting that it is built with drop frame, 20½ or 22½ inches, for ladies' use. Weight, about 24½ lbs.

ARENA MODEL L is very similar to above, but a little less expensively constructed. Finish, maroon enamel, nickel trimmed. Price, \$40.00.



Tribune Model 350. Price, \$75.00.

Model 350 is built for road racing and for all purposes where a light wheel is desired. The frame is built in 23-inch height only. Drop to hanger, 2½ inches; 7-inch cranks; Tribune special single-tube racing tires. Weight, about 21 lbs. Finish, black, gold striped.

**We build also a large variety of higher-priced wheels, including TANDEM, TRIPLETS, ETC.**

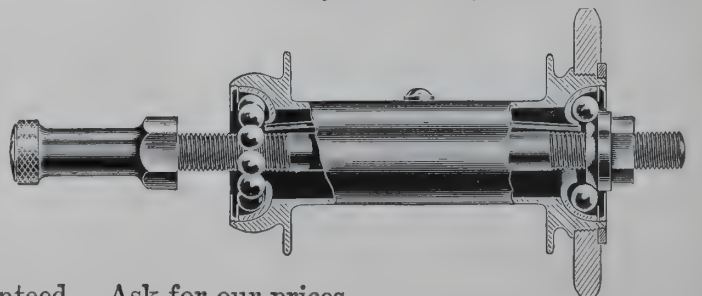
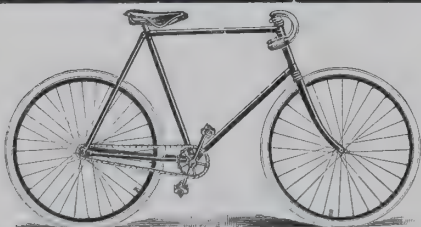
Handsome illustrated catalogue describing our full line, MAILED FREE.

## HUNTER ARMS CO.,

- FULTON, N. Y., U. S. A.

Hunter and Fulton  
Bicycles.

HUNTER HUBS.



Everything we manufacture is strictly high-grade and fully guaranteed. Ask for our prices.





Times have changed, indeed, when American-made steel is shipped to England to be made into bearings and other cycle parts.

It is reported that one of the best-known French pneumatic tires, the Michelin, is now delivered with wooden rims with aluminum lining.

Nothing authoritative has as yet been published regarding tire prices for 1899. The indications are that rubber will be lower than at present, but it is thought that the price of tires of standard makes will show a decided advance.

Tom Linton, the English middle-distance rider, in a recent interview had this to say of American machines: "They have the finest pacing machines in the world, and the singles used by the racing men are the best and lightest that I have ever seen."

The bicycle moves with less friction than any other vehicle on earth.—*Exchange.*

Especially the American bicycle, as it moves on the markets of Europe, Asia, Africa, Australasia and the rest of the world.

A tribute to the worth and reputation of American wheels that is not likely to be very warmly appreciated is the appearance of a bicycle made in Japan bearing the name-plate of a well-known American manufacturer. As was to be expected the bogus wheels are poor imitations of the original.

It appears that English riders are finding more difficulty than usual this year with their metal rims, and their trade press critics are attributing it to imperfect soldering, rim brakes, etc. Would it be impious to suggest that American riders long ago obviated these difficulties—by adopting wood rims.—*The Bicycle World.*

An English rim maker has brought out as a novelty a rim made of aluminum. In this country aluminum rims have been made since 1893 or 1894, and only the great favor accorded wood rims prevented their being extensively used. They possess all the good qualities of the steel rim, with the lightness of the wood rim.

In a recent interview a prominent American cycle manufacturer was asked about the prospects for 30-inch wheels. His reply was:

"We have always made and catalogued them. Some riders need 30-inch wheels as much as they do No. 8 shoes."

"Will the percentage of 30-inch wheels be 20 per cent. in 1899?"

"Not 1 per cent."

It is reported that English riders are having more trouble than ever with the metal rims which are still placed on most of the wheels made over there. It may be due to the action of rim brakes, which have become rather popular, but on the other hand a good many fellows have gone wrong without such additional strain being placed upon them. One writer attributes the fault to the fact that some of the best-known rims are only soldered, instead of being brazed, as they should be. With the small amount of clearance now allowed, it is a very serious matter if the wheel goes much out of truth, and may even cause a bad accident.

One of the most interesting incidents in the bicycle world on this side of the Atlantic is the racing rebellion. The professional track riders have long chafed under the strict rules of the League of American Wheelmen, the organization that has for some time controlled track events in this country. Recently they seceded in a body and organized an association of their own. One result of this action is that they are barred from competition in any country under the jurisdiction of the International Cyclists' Association, of which the American L. A. W. is a member. The final outcome of the trouble is still uncertain, though the chances are greatly in favor of the L. A. W.

### Is the Popularity of the Bicycle Decreasing?

A WRITER in *The India Rubber World* has the following sensible remarks to make on the much-discussed topic as to the bicycle's decline in popularity: "Without doubt there has been a decline in bicycling where it has existed only as a 'fad,' and some of the most enthusiastic cyclists of the past season or two have returned to horseback-riding for exercise, but their number is insignificant in comparison with the masses who never owned horses and never will. The number of users of the bicycle as a means both of recreation and of locomotion undoubtedly is increasing, and seems certain to continue to do so, at least until some hundreds of thousands of people have been supplied who could not afford the former high prices, but who can pay the lower prices of to-day. When everybody has been supplied who is able to own a bicycle and who cares to ride one, the volume of renewals required annually will support a large industry, both in bicycles and in tires. There is no danger, in any event, that the demand for rubber in the bicycle trade will fall off. The only question relates to the changes which may take place.

"There is a prospect, however, of a smaller rather than a larger number of bicycle manufacturers. After the failures and assignments in this industry during the past year, capitalists naturally will be discouraged from investing in new factories, banks will be more cautious about extending accommodations, and every fairly good factory superintendent will not, as in the past, imagine himself able to organize and manage successfully a bicycle plant of his own. If all the wheels manufactured in the past, with the *bona fide* intention that they would be sold at the high prices which prevailed for awhile, had been sold as advertised—and the cash collected for them—large fortunes might have been made in many cases where, as a matter of fact, nobody profited except a sheriff or assignee, and that only to the extent of their fees. The outcome of the industry is likely to parallel that of the sewing-machine trade. There was a time when everybody who could do so went into sewing-machines, until a reaction came, with a gradual reduction in the number of manufacturers, either through failure or by consolidation."

### Decline in Number of "Options" Offered to Riders.

A FEATURE of the bicycle trade in this country that is of interest is the evident tendency among bicycle manufacturers to reduce the number of "options" which they offer to buyers. While the whole cycling world was at sea as to the comparative merits of various tires and other accessories, the bicycle manufacturer's strong point was in the model adopted for his wheel, allowing the purchaser to exercise the widest latitude in the choice of tires and the like. Now that cyclists have learned that less difference than was formerly supposed exists between different makes of goods—so long, of course, as quality is maintained—bicycle makers as a rule, seem disposed to adopt a certain equipment as their standard and to allow few or no options. One result of this is to reduce their business to a better system, relieving them of expense as well as trouble. The cyclist who admires a given model is apt, generally, to take it with whatever equipment is offered by the manufacturer, but in the few cases where he is not, the manufacturer is willing that he should buy elsewhere, rather than be troubled with helping to fit him out with a special make of tires, saddles, or what-not. Hence it is probable that fewer manufacturers than hitherto will be found listing both single-tube and detachable tires in their bicycle catalogue.

### The Tire-Stripping Fraud.

NOTHING has put so much of a premium on thorough acquaintance with bicycles as the auction rooms, the "special sales" and the "bargains" of the jobbing stores. One of the chief sources of profit for cut-rate dealers is in "stripping" high-grade tires, saddles, pedals and other accessories, and replacing them with cheaper products, while holding the others for sale at cut prices. This is an evil that it is impossible to correct, and no one who is ignorant of bicycle accessories can protect himself against it. When it is known that there is \$5 or \$6 difference between the cost of the best tires and inferior ones, it can be readily appreciated how much "stripping" enables unscrupulous dealers to cut prices and yet make a respectable profit at both ends of the deal. Readers of THE AMERICAN EXPORTER who are commissioned to fill orders at absurdly low prices should warn their clients and be themselves on their guard against this fraud. Buyers of bicycles sold at living prices by responsible firms need have no fear.



### Standard Sizes for Interchangeable Parts.

THE desirability of having the axles, nuts, spokes and nipples on bicycles of different makes and models interchangeable has, for several years, prompted strenuous efforts to influence all manufacturers of these parts to adopt certain standard sizes to be known as the United States standard. So far as spokes and nipples are concerned these efforts have been very successful, and the attention of manufacturers is now being called to the value of adopting a standard of sizes and threads for axles and nuts.

To manufacture axles cheaply, and to make prompt shipments as well as to have last year's parts agree with this year's parts and with other prominent manufacturers' parts, it is evident that a standard gauge must be established. In many other lines, like those of the master car builders, pipers, steamfitters, etc., standard threads have been adopted, and the entire trade has been benefited. Wide differences have been noted in the size of rod, shape and pitch of the thread, varieties of the thread, etc., in the bicycles commonly used. Some axles alleged to be three-eighths of an inch in diameter have varied from .008 small to as many thousands large, and the pitch of the thread has run from 20 to the inch to 32 on the same size rod. It has been made apparent that there is great call for uniformity and for a standard of size and thread which should make parts interchangeable, and should settle manufacturers upon a standard to which all may direct their energy, and which in time will become recognized everywhere.

After consultation with many of the largest manufacturers in the country and with leading authorities on the subject of threads, and having taken counsel of their own experience during many years of practice in this direction, a well-known company engaged in making these parts suggests coöperation in the adoption of the following United States standard:  $\frac{1}{4}$ -inch axle, 30 threads; 5-16-inch, 28;  $\frac{3}{8}$ -inch, 24 threads.

These sizes, number of threads and styles of thread have been found to be the best, it is claimed, for the purpose for which they are used. Those who conform to this suggestion will then have a  $\frac{3}{8}$  axle that is always  $\frac{3}{8}$  and that always runs 24 threads to the inch on this size, and always conforms to the United States standard, and hence must interchange with anything else that is made to the same standard.

### Motor Carriages in America.

WHILE the palm of being the first to demonstrate that motor carriages were practical vehicles, and possible in a commercial sense, must be awarded to the French, with the English following in their footsteps, yet it is already becoming apparent that American makers, at least, are not going to lag behind much longer. While the public interest in these self-driven vehicles is increasing rapidly, and their use is becoming less rare, the makers are forging ahead at a much more rapid rate. It is scarcely an exaggeration to say that they are already far in advance of the market here, and that a better appreciation of their work is accorded them in France and England.

It is probable, of course, that this is due to the inevitable superiority of American machinery building. Given a maker who studies the work of the foreign motor carriage builder and sets out to improve on it, there can be but one result. That this is the case is shown by the number of foreign orders that American makers are receiving. In fact, it can almost be said that their foreign trade exceeds their home trade, and they have only to show their machines abroad to receive large orders for them, while here the public still needs to be educated. This leaves no doubt of the soundness of the construction, as well as the advanced nature of the designing of the American machines.

Even yet the industry is in its elementary stage. Neither of the two important features—the method of driving and the shape or form of the carriage—can be said to be in other than a transitory stage. Out of all the experimenting and testing that are now going on, involving the expenditure of millions of dollars yearly, a material advance toward finality must come before long. But it is quite true that at the present time not even the most successful makers can say they have reached such a state of perfection as is possible with such vehicles. There is not one who does not expect to make a tremendous advance within the next year, and there is scarcely a point where such an advance is not possible.

The most serious problem is, of course, the selection of the best motor. Electricity, gasoline and steam each has its advocates, and each has made wonderful strides within the past six months. Indeed, it is only within that time that the different users of these motors have been able to overcome some of the most elementary difficulties. The advance in each has been so

great that any one would have outstripped the others had the latter remained stationary. These advances mark the approaching of the time when even the most prejudiced users of carriages can be convinced of the entire practicability of the motor-driven vehicle, and when that period is reached even the extremely high prices at present prevailing will not prevent their coming into general use. Even at the present time there is scarcely a maker who is not able to sell his machines as rapidly as he can turn them out.

### United States Shoes in Germany.

THE import of American shoes into Germany, although still rather small, has increased very rapidly within the past eighteen months, and has demonstrated most conclusively the practicability of exporting shoes to this country.

Twenty years ago American shoes were unknown in that country; indeed, at that time our shoes were not regarded as superior to those of German manufacture, but the many improvements which have been made in machinery, together with the careful study which our manufacturers have made of style and comfort, have placed our shoes in the front rank. An American can almost always be distinguished in a crowd by his shoes. In 1880 the value of shoes imported into Germany from the United States amounted to \$1,666; in 1890, to \$9,044; in 1896 it was \$39,508; and for the first five months of this year the total value of the shoes imported from the United States was \$59,500. At this rate, the increase for 1898 will not be less than \$100,000 over the imports of 1896.

### A Lesson in Trade Unionism.

OUT of evil good often comes. One of the consequences of the recent engineering dispute that may be regarded as likely to produce ultimately beneficial results was the large amount of information afforded, through the press and otherwise, as to the conditions and success of foreign competition. Perhaps the most important part of the knowledge imparted on this subject was that which relates to the different attitudes taken up by foreign labor, and especially by American labor, in reference to the work that it is called upon to perform. Almost every American who has spoken on this subject has borne testimony to the fact that the broad distinction between American and British labor may be most fitly expressed by the remark that the one tries to do as much and the other as little as possible; or, in other words, that while the one works without restraint, for his own hand, the other works in fetters imposed by the union. The dispute may have done good if it shows British workmen that the Americans have "a more excellent way."—*Iron and Coal Trades Review*, London.

### A Busy Week at Pittsburg.

THE following from *Dun's Review* for the week ended October 8th will give a general idea of the rush in the finished iron trade: "Contracts for bridges at Pittsburg with other new tonnage constantly coming, including 8,000 tons for Boston, keep the structural works there crowded, and the McCormick building at Chicago requires 2,000 tons, causing a pressure never equalled there. Plate works are everywhere crowded and most mills are behind orders, Cleveland having placed 3,000 tons for ship plates, Chicago 2,000 tons for cars, and Philadelphia mills being full. Bar mills at Pittsburg have much new business, and at Philadelphia they have all they can do, while at Chicago the new orders for 2,500 cars by the Pennsylvania and 2,000 by the Northwestern, with others, make the business heavy. Consumers of black sheets have generally covered for some time, but galvanized are in large demand. One contract for 100 miles of pipe has been placed at Pittsburg, and thirty miles more are in sight.

**American Bicycle Accessories in Scotland.**—The American consul at Dunfermline, Scotland, writes: "I find that bicycle accessories of American manufacture are handled in a greater or less degree by most dealers, and are considered highly satisfactory. Very few, however, import directly, most of them receiving their supplies through London importers. I have found but one dealer who receives his bicycles and supplies direct from the United States. He speaks very enthusiastically of the merits of American bicycles, and assures me that he prefers to deal directly with the American manufacturer, having found by experience that it is greatly to his advantage to do so."



# OUR TRIPLE ALLIANCE.

## Combined Grater and Slaw Cutter.

Slicer sheet is made of Apollo galvanized iron; sharp steel cutting blades; Grater blank is uniform and perfect. It will slice cabbage, apples, potatoes, cucumbers, turnips, beets and everything in the vegetable line. Every woman buys one on sight.

PAT. AUG. 15. 1893.



## Famous Parer and Slicer.

Polished beech handle; nickel plated; steel blade and ferrule; the lip prevents wasting material. More of these Paring Knives sold than all others. Send sample order.



## Standard Meat Tenderer.

Steel cutting blades not too sharp; it is the only Meat Tenderer that will actually make tough meat tender; separates the fibers of the meat, allowing the boiling juice to penetrate and soften them; does not pound the juice out of the meat.



For prices see price current, f. o. b. New York City.

## ILLINOIS CUTLERY CO.

DECATUR, ILLINOIS, U. S. A.

## 3,000 Bicycles,

Surplus stock of high-grade '98 models, must be sacrificed. Strictly up-to-date guaranteed machines worth \$30 each;

Our price, to close out, **\$16.00**

Complete; choice of style.

Sample shipped on approval to any part of the world on receipt of \$5 deposit, or send order through any reliable commission house.

References: First National Bank, Chicago; Geo. W. Sheldon & Co., Exporter, New York.

**G. B. MEAD CYCLE CO., Chicago, Ill., U. S. A.**

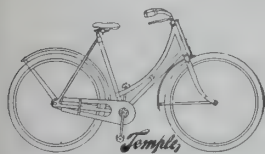
Cable address: "MEAD CYCLE," Chicago. A B C Code.



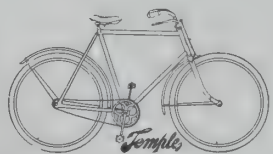
## IDEAL PLATING CO., BOSTON, MASS., U. S. A. Ideal Handle Bars.

	Mfgs. of high grade only.
Adjustable Bars, all styles, 1 doz. lots, - - -	<b>\$13.50</b>
Stationary Bars, all styles, 1 doz. lots, - - -	<b>16.80</b>
Adj. Stems, separate, all styles, 1 doz. lots, - - -	<b>12.30</b>
Internal Binders, - - -	<b>10.50</b>
Internal Binders, - - -	<b>4.80</b>
Internal Binders, - - -	<b>9.60</b>

Liberal discount to trade in large quantities. Prices without grips f. o. b. Boston. Terms: Cash with order, or C. O. D. All goods guaranteed against imperfections in material and workmanship.



# Temple



<b>Temple Scorcher.</b>	Discount to agents, 50 per cent.	List price, <b>\$75</b>
<b>Temple Special</b>	Discount to agents, 45 per cent.	List price, <b>\$60</b>
<b>Temple Superb.</b>	Discount to agents, 40 per cent.	List price, <b>\$50</b>
<b>Temple Faultless.</b>	Discount to agents, 35 per cent.	List price, <b>\$35</b>

Best and cheapest line of Bicycles made in America.

Machines for Ladies the same price as for Men's.

Fitted with the best Saddles, Pedals and Tires.

Spanish Catalogues, and all letters written in Spanish.

TERMS: Cash in "New York" or "Chicago," to be paid us on delivery of complete shipping documents. Bicycles will be placed F. O. B. steamship at New York if desired, at no extra cost. "Send us sample order."

**RALPH TEMPLE CYCLE CO., 204 35TH STREET, CHICAGO, U. S. A.**

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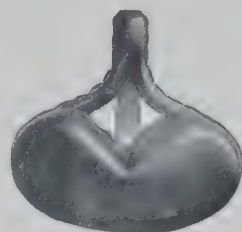


Designed with special regard for conformation to the human body in the sitting posture. Recommended by physicians.

Flat Coil Steel Spring.  
No Rebound.  
No Pressure on Soft Parts.  
Cool. Comfortable.

RETAIL PRICE, \$3.50.

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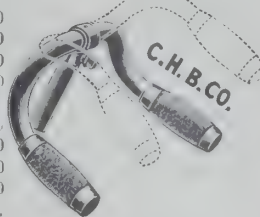
**GLOVER CYCLE SADDLE CO., Jackson, Mich., U. S. A.**

## BICYCLE HANDLE BARS. Best Nickeled over Heavy Copper. Made 7-8 Tube Tops.

PRICES, WITHOUT GRIPS, F. O. B. NEW YORK.

Upturned, one doz. lots	\$10.50
Drop, one doz. lots	10.50
Octagon Tube, extra, per doz.	3.00
"Schinner" Bars, extra, per doz.	1.20
One-inch Tube, extra, per doz.	1.20
Ram's Horn, one doz. lots	11.50
Adjustable, one doz. lots	13.50
Anti-Vibration, extra, per doz.	3.00
Seat Posts, per doz.	3.60

Any size stems. Discount to the trade on 100 to 50,000 lots.



**Chicago Handle-Bar Co., 34 & 36 Market St., Chicago, Ill., U. S. A.**

## 2,000 '97 and '98 Model Bicycles



MUST BE CLOSED OUT  
REGARDLESS OF COST.

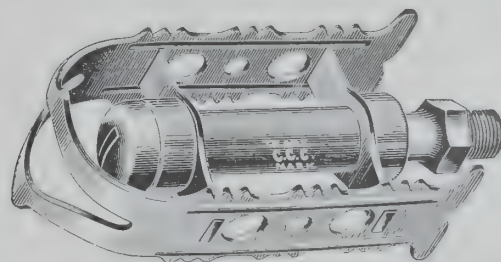
**\$13.00** and  
Upward.

Write for particulars.  
Most complete line in America.

In sending orders through export houses send us duplicate.

**THE BROWN-LEWIS CYCLE CO., 300 Wabash Avenue, CHICAGO, ILL., U. S. A.**

## The Successful Pedal of 1898.



Stamped from best grade Steel; no castings used; the balls, cones and axles are made from Tool Steel, hardened and ground. All parts are heavily coppered and nickeled and INTERCHANGEABLE.

## CYCLE COMPONENTS CO.,

9-13 Maiden Lane, New York, U. S. A.

## "THE FINEST ON EARTH."

That's a broad claim to make for anything, but in the case of the

## MANSON 3 CROWN

MODEL 33

it's but the simple truth, and there is no need to deviate from the truth.

## The Several Reasons Why?

It is made of the very best material.

It is new and novel and eminently practical.

It has two rear crowns to match the front fork crown, causing the machine to be absolutely rigid.

It has an eccentric bracket at the hanger which facilitates the adjustment of the chain without using the rear chain adjusters, and is fitted with the one-piece Fauber crank.

The Thor Hubs are used and recognized everywhere to be the best.

The best swaged spokes, 14x16 size, are used.

Laminated or one-piece selected rock-clim rims, 1 1/4 or 1 1/2, 28-inch wheels, drilled 32x80.

The Peacock or Baldwin adjustable chain.

Head set, turned from bar steel, drop forging connections.

Seamless tubing throughout.

Dunlap tires.

Steel adjustable handle bars.

Christy saddles.

Record pedals.

Finest nickeling and enameling that can be put on a bicycle.

Frames, 22 and 24 in. high.

Weight complete, 24 lbs.

Choice of gear.

Ladies' frames are made same as gents, with exceptions of drop bar and chain guards. Height, 20 and 22 inches.

**MANSON CYCLE CO., 73-75 West Jackson St., Chicago, Ill., U. S. A.**



### Direct Steamship Line Between New York and Russia.

IT is announced that the United Steamship Company, of Copenhagen, which possesses a large fleet of steamships, is about to establish a line direct between Russia and the United States. The boats will make the experiment of running between St. Petersburg, Riga and New York. The advantage to the exporters in the United States of this direct line, which has not hitherto existed, will be in cheaper freights and avoidance of transshipment. It is hoped there will be sufficient goods to make the trial successful and induce the company to continue the line. The existence of such a line is certain to increase the trade between the two countries.

The United Steamship Company has been in existence about thirty years, has a capital of about \$12,000,000, and owns over 120 steamships trading between various European ports. It is estimated that Russia alone consumes 1,000,000 bales of cotton annually, of which a comparatively small proportion comes direct from America; but this proportion could be immensely increased by avoiding the delay and expense of transshipment at Liverpool, Hamburg or Bremen. The same is true in respect to the products of American manufactories, for which there is an increasing demand from Russia. The United Steamship Company has now a bi-monthly line to Newport News and New Orleans.

### The Growing Export Trade of the Southern Ports of the United States.

THE following table gives a statement of exports from Southern ports for the fiscal years ended June 30, 1888 and 1897:

Ports.	1888.	1897.
Baltimore.....	\$45,114,613	\$98,609,683
Beaufort.....	849,839	2,605,896
Brunswick.....	4,617,903	8,693,222
Charleston.....	13,003,628	10,794,000
Fernandina.....	176,377	1,997,172
Newport News.....	6,281,664	25,924,908
Norfolk.....	13,812,641	15,399,456
Savannah.....	17,850,223	26,406,033
Wilmington.....	6,198,144	9,357,447
Corpus Christi.....	1,952,812	4,372,821
Galveston.....	14,496,669	60,958,589
Mobile.....	3,442,619	8,140,502
New Orleans.....	80,906,145	99,899,819
Paso del Norte.....	33,759	5,514,968
Pearl River, Miss.....	851,586	1,744,300
Pensacola.....	2,691,268	8,436,679
Saluria, Tex.....	1,325,122	1,433,745
Total.....	\$223,779,533	\$391,473,736

The increase in the decade has been \$167,694,203, or 75 per cent. This is certainly a highly creditable showing and indicates the growing success of Southern manufacturers in the foreign field.

### The Manufacture of Briar Pipes in America.

THE manufacture of briar pipes in this country is an industry of comparatively recent date. "Less than ten years ago," said a prominent manufacturer the other day, "the making of briar pipes was done almost entirely in France and Germany; but with the increasing demand for cheap pipes in this country came the necessity for producing a finished article at a cost that would permit of its being sold at popular prices. This was finally brought about by the improvements in wood-turning machinery, and subsequent inventions have so far improved upon the machinery used that American manufacturers are now making the greater part of the pipes used, and turning them out at a price which, ten years ago, would have seemed literally impossible. The greater number of pipes imported here formerly came from France, but a good many were supplied by England. The wood from which we manufacture them is still imported from Europe. France is our largest supplier, as the quality of the material grown there is superior to that grown anywhere else. A good briar is produced in England, and in some parts of Germany, but our main dependence is upon French supplies.

"American briar pipes are now produced in very great variety, and of every quality, from the cheapest to the very costliest, and they are made in better styles and put up more suitably for the trade than those imported, with the result that they have all but supplanted briar pipes of European make in this market. The wood comes over to us in rough blocks free of duty, packed in bags. These bags hold from two to three hundred blocks each, and our importations will, I think, run up to about 6,000 bags every

year. The blocks are roughly shaped when they arrive, and are put in what is called a 'frazing' machine. This shapes the bowl and cuts away the superfluous wood. Another machine reduces the stem and hollows out the bowl, after which it has assumed some semblance of shape, and is then carefully sandpapered and pumice-stoned, until it is reduced to the proper size. The last operation in the ordinary briar pipe is the drilling of the air hole. It is then fitted with a stem and trimmings, and is ready for sale.

"The stems are made of either celluloid, bone, hard rubber or amber. The amber is the costliest material used, and is rarely attached to the cheaper grades of pipes. They are shipped to all parts of the country, and the demand is steadily on the increase. As to the number of briar pipes manufactured, I think it would be impossible to give any figures. Every smoker nowadays prefers a briar to a clay, and some prefer it to the meerschaum."

### Improved Service Between New York and Denmark.

THE new Scandinavian-American Line, formerly known as the Thingvalla Line, will operate a weekly instead of a bi-monthly service between this port and Christiania, Copenhagen and Stettin, commencing on December 1st. The company is now operating only four steamships, the *Norge*, *Hekla*, *Island* and *Thingvalla*, which carry both freight and passengers. Four additional steamships will be added for the freight service, and as soon as they can be built new boats will be put on for the passenger business.

Business between the United States and Sweden is growing steadily, and merchants of that country are finding a liberal market here to purchase in. They are buying largely of our grain, corn, pork, products, machinery and agricultural implements. They are also taking some of our cotton, bicycles, tobacco, hides, leather, organs, pianos, etc. The company has ample dock facilities at Hoboken to meet all the requirements of the increased service.

### American Boots and Shoes in British Guiana.

THE British colony of Guiana with its population of 275,000 and limited resources would scarcely seem to have been worth attention from the manufacturers of boots and shoes and leather with so many larger markets open to them, but here, as elsewhere, they have made a vigorous attack on the market, and apparently a very successful one, although they are as yet far from having captured the entire market. The following table shows the sales made during the past five years:

1892-93.....	\$1,046
1893-94.....	2,732
1894-95.....	1,146
1895-96.....	7,221
1896-97.....	8,870

These figures indicate an increase of no less than 747 per cent. in five years. During the same period the sale of English boots and shoes in the colony declined 23 per cent, while the sale of Canadian, which in 1892-93 surpassed those of goods from this country, ceased altogether.

**Remarkable Test of Fire Hose.**—The city of Nashville, Tenn., in August, advertised for fire hose under these unusually severe conditions: (1) Each length to be tested separately to 400 pounds; (2) in case of a single burst, the entire lot of hose to be rejected and \$500 in cash forfeited. Usually tests of fire hose are made on a small percentage of the length of hose, taken at random out of the lot. The test took place at Nashville on September 12th, in the presence of a large number of spectators, the gauge being inspected and approved by a professor of Vanderbilt University. Manufacturers were found who were willing to submit their product to this severe test, and the make finally selected by the committee not only stood the test in every separate section of 50 feet, showing no evidence of breaking or giving way, but won the warmest encomiums of the judges as well.

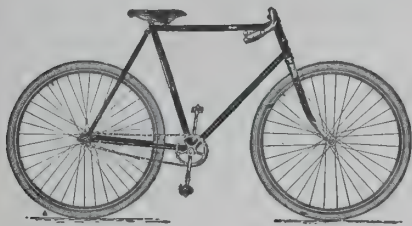
**The African Market for American Furniture.**—According to the United States Consul-General at Cape Town, the total imports of furniture into South Africa in 1897 were valued at \$2,140,199, of which the United Kingdom contributed \$1,611,649 worth, United States \$255,321 worth, Germany \$49,897 worth, and Sweden \$50,037 worth. The American trade is increasing by far the most rapidly, and their goods would thus appear to be giving excellent satisfaction.



**TRENTON WATCHES and CYCLOMETERS** give universal satisfaction. Various sizes and grades of watch movements and complete watches, with cases of numerous characters, and several styles of Cyclometers, suit all requirements. Prices to the trade upon application.

Duplicates of orders given commission houses should be sent direct to factory.

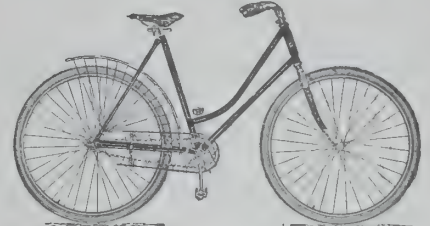
**TRENTON WATCH CO.,** Trenton, N. J., U. S. A.



*Soudan*  
**Bicycles.**

**\$27.50** net cash,

complete with  
Morgan & Wright,  
Dunlop, or  
G. & J. Tires.



Terms: Sight Draft against Bill of Lading payable in New York,  
F. O. B. steamer New York City.

**THE SOUDAN MANUFACTURING COMPANY,** Successors to MASON & MASON CO.,

CABLE ADDRESS: "SOUDAN, CHICAGO."

CHICAGO, ILLS., U. S. A.

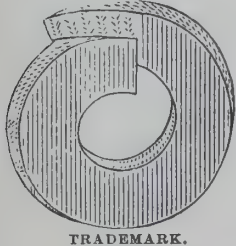


**SPEARE'S CROWN COLD WATER PAINT**

**The Original Fireproofing and Waterproof Paint.**

When combined with cold water makes the finest paint on earth. Especially adapted for out-buildings, private residences, factories, breweries, tanneries, stables, fences and cellars. Its fireproofing and waterproof qualities make it especially valuable for manufacturing establishments and large buildings of every description. Comes in powder form, in white and colors. Orders filled through commission houses. Send for color card, free sample and catalogue "1." Goods sold under absolute guarantee not to peel, crack or wash off. In ordering specify whether wanted for inside or outside use.

**ALDEN SPEARE'S SONS & CO.,** No. 369 Atlantic Avenue Boston Mass., U. S. A.



TRADEMARK.

**COULD'S STEAM AND WATER PACKING.**

Patented June 1, 1880.—The Original Ring Packing.

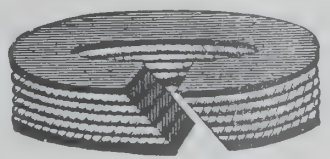
IN ORDERING, GIVE EXACT DIAMETER OF STUFFING BOX AND PISTON ROD OR VALVE STEM.  
**SELF-LUBRICATING, STEAM AND WATER TIGHT.**

Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. EVERY PACKING FULLY WARRANTED.

N. B.—This packing will be sent to any address, and if not satisfactory after a trial of 30 days, can be returned at our expense. None genuine without this trademark and date of patent stamped on wrapper. All similar packings are imitations and calculated to deceive.

**THE COULD PACKING COMPANY, EAST CAMBRIDGE, MASS.**

ORIGINAL RING PACKING



ALBION CHIPMAN, Treas.

Pat. U. S. D. Heel Shave.

Made in 16 sizes.

**SNELL & ATHERTON,**

72 Snell St., Brockton, Mass.  
U. S. A.



MANUFACTURERS OF

Edge Planes, Heel Shaves,  
Welt Trimmers, Burnishing Irons,  
Edge Setter Irons, Breasting Knives.  
Knives for Machines made to order.

**FINE SHOE TOOLS**

FOR EXPORT TRADE.

Orders filled through commission houses.  
Correspondence solicited. Catalogue "S" on application.

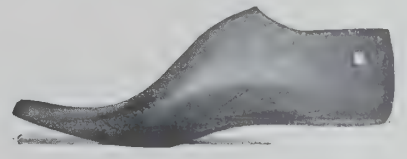
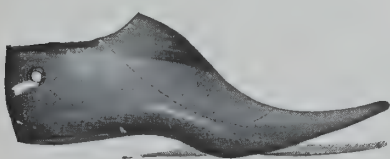
**S. PORTER & CO.**

Manufacturers and Exporters of a

Full Line of Men's, Women's and Children's **LASTS.**

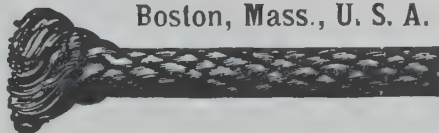
Orders filled through Commission Houses.

Correspondence solicited. Worcester, Mass., U. S. A. Catalogue "B" on application.



**SILVER LAKE COMPANY,** THE ORIGINAL MANUFACTURERS OF **Solid Braided Cordage.**

WINDOW SASH CORD, } COTTON, LINEN OR  
RAILROAD BELL CORD, } ITALIAN HEMP.  
ARC LIGHT AND TROLLEY CORD.



THE BEST IS THE CHEAPEST.

CLOTHES LINES,  
AWNING AND MASONS' LINES,  
CHALK LINES, ETC., ETC.

Catalogue "A" on application.

**STEAM PACKINGS. SILVER LAKE & MILLER SOAPSTONE PACKING.**

Send for Samples.

**LOVELL MFG. CO. (LTD.)**

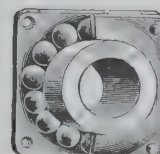
ERIE, PA., U. S. A.

Manufacturers of a Full Line of

**CLOTHES WRINGERS,**

**Rat and Mouse Traps**

Send for Catalogue.  
Special attention given to export orders.  
Correspondence solicited in any language.



SECTIONAL BEARING.



**SPECIAL HIGH-  
GRADE ROLLS.**





## LATEST CATALOGUES.

*These catalogues may be had free of charge on application to the firms issuing them.  
Please mention THE AMERICAN EXPORTER when you write.*

THE LUNKENHEIMER COMPANY, Cincinnati, Ohio, U. S. A. Descriptive circular of a new automatic balanced whistle valve.

THE BLACK MANUFACTURING COMPANY, Erie, Pa., U. S. A. Advance specifications of their "Blue Streak" models for 1899. Illustrated and full of interest for the dealer.

THE TRENTON WATCH COMPANY, Trenton, N. J., U. S. A. Price list of complete line of watches manufactured by them. Illustrated. A cyclometer price list is issued separately.

WESTERN FURNITURE COMPANY, St. Louis, Mo., U. S. A. Illustrated catalogue of roll and flat top desks, cabinet secretaries, china closets, book-cases, combination cases, office chairs and similar lines. Exact size and weight given in each case.

THE AMERICAN WRITING MACHINE COMPANY, 237 Broadway, sends us a neat little folder entitled "By Way of Introduction" and describing the salient features of their "New Century Caligraph" writing machine which has just been placed on the market.

MOLLENKOPF & MCCREERY, Toledo, O., U. S. A. Descriptive circular and price list of their new improved thermal vapor-bath cabinet. Contains detailed explanation of the principles upon which the success of this cabinet is based, instructions, testimonials, etc.

THE KEYSTONE MANUFACTURING COMPANY, Sterling, Ill., U. S. A. Illustrated circulars describing their new "Keystone" fodder shredder and snapper; also a full line of pulverizing and seeding machines, including disc harrows, disc seeders, lever harrows, broadcast seeders, etc.

THE EDSON MANUFACTURING COMPANY, 132 Commercial street, Boston, Mass., U. S. A. Illustrated booklet describing their "Malden" odorless sewage disposal system, the Edson trench pumps, diaphragm force pumps, etc., also a line of street sweeping machinery, automatic bottle filling machinery, ship and yacht machinery, etc.

THE LENOX MACHINE COMPANY, Marshalltown, Ia., U. S. A. Illustrated catalogue of the Lenox gas and gasoline engines, both portable and stationary. Also large illustrated catalogue of "Marshalltown" patent well-drilling machines, drillers' tools, boilers and engines and other supplies. We note also an improved tapping machine for tapping water mains under pressure.

THE STANDARD TOOL COMPANY, Cleveland, O., U. S. A., send us a beautifully illustrated catalogue of electrically-welded bicycle parts manufactured by them. These include seat posts, forks and stays, fork-sides, handle-bars, bicycle tubing, etc. This is but one department of the manufactures of this company, other departments comprising twist drills, reamers, chucks, milling cutters, taps and other metal-working tools.

THE LINK-BELT MACHINERY COMPANY, 39th street and Stewart avenue, Chicago, Ill., U. S. A. Export Catalogue and Price List No. 23B of over 100 pages, handsomely illustrated. This catalogue gives descriptions of the almost numberless devices made by this firm for the elevation and transportation of cargo or of articles in process of manufacture, together with a very interesting series of views of various notable installations made by this company both at home and abroad.

**A Novel Shop Whistle.**—A shop whistle has recently been invented and placed in Philadelphia which is blown by the tri-combination of steam, electricity and clockwork. Precisely on the second of 7 in the morning, 12 noon, etc., the big steam whistle on the works blows for a few seconds and then automatically stops. The clock, which is located in the office, some 150 feet from the works, fulfills all the functions of an ordinary timepiece, as well as releasing the sonorous voice of the whistle. The construction of the clock is so arranged that in order to change the time of starting or stopping the works, all that is necessary is to move an electric indexed switch to the exact moment desired. Should fire occur in any part of the works, by an ingenious arrangement of a thermostatic "cut out" the whistle would blow and continue blowing until stopped by a switch for the purpose. The thing is entirely automatic and needs no attention except the weekly winding of the clock.

### American Trolley Cars for the Argentine.

A FIRM of American manufacturers recently completed a number of trolley cars for the government of Argentina, which will be used at Buenos Ayres and other places for the transportation of meat from the government abattoirs, located in the suburbs, to the butcher shops and markets of the cities. Formerly this transportation was effected by horse cars, but the introduction of electric traction made possible much larger cars and speedier service. All the slaughtering of cattle must be done at the government abattoirs, and in this way it is possible to provide a thorough inspection of all meat before it is offered for sale.

For many years the horse cars have been used to bring in the dressed meat, but the objection was made that it was liable to suffer injury from the heat and dust, so that now in the improved trolley cars the meat is carried in specially made boxes, which are handled at either end of their journey by a large crane. For this purpose not only motor cars are used, but also trailers, and a train of such cars can be run to the city and the markets.

Buenos Ayres has recently ordered twenty motor cars and seventy-five of the trailer class, so the extent to which they are used can be appreciated. The meat boxes are lined with zinc, and are provided with ample ventilating arrangements. Each box carries about 6,000 pounds of meat, and the system has been found most efficient from every possible standpoint.

### Overhead Switches on the Brooklyn Bridge.

THE four loops forming the New York terminus of the trolley lines coming across the New York and Brooklyn Bridge have given no little trouble in the trolley switches. The trolley lines are necessarily low, owing to the structure under which the cars run, and the trolley poles are consequently pressed down until almost horizontal. The sharp curves necessary to enter between the columns supporting the structure overhead brings sharp bends into the overhead wire, and twist the wheel flanges at many points considerably out of the general direction of the wire which they must follow. The trolleys continually run off at these curves and miss the switches to the various loops.

An ingenious remedy for this is now being tried on one of the incoming switches and curves. The arrangement consists simply of a shallow, inverted metal trough, about 1 foot in width, with downwardly projecting flanges to keep the trolley from running off at the sides, against which the flanges of the trolley wheel can run and from which they can collect current. The trough narrows at its ends in a V shape, which guides the trolley wheel onto the wire, starting from the point of the V. At switches the trough is full width, so that if the trolley wheel follows the car with any accuracy at all it cannot go wrong at these points. The arrangement is not unsightly in this particular instance, owing to the fact that it is under cover. Its operation appears to be very satisfactory.

### How Iron and Steel Prices Have Declined.

AN interesting comparison of prices of Bessemer pig iron and Bessemer steel billets has been brought out by an inquiry from a correspondent who asks for Pittsburg quotations in January and February, 1890, in May, 1895, and at the present time. Our market reports show that in January, 1890, Bessemer pig iron opened at \$24.25 to \$24.75, and gradually receded during the month, week by week, closing at \$23 to \$23.50, while billets ranged from \$36.50 to \$37.25. In February the decline in pig iron continued, the month closing with quotations of \$21.50 to \$22, while billets also declined until they were quoted at the end of the month at \$34.50 to \$35.50. From that time prices fell almost uninterruptedly until in January, 1895, Bessemer pig iron was quoted at \$9.85 to \$10 and billets stood at \$14.75 to \$15. In 1895, however, prices reacted sharply, quite an upward movement being marked in May, when Bessemer pig iron, which had opened at \$10.75 to \$11, advanced 25 to 50 cents every week until the month closed with quotations of \$11.65 to \$11.90, while billets, which began the month at \$15.50 to \$15.75, jumped over more ground and closed at \$17.50 to \$17.75. The rise of 1895 was short-lived, however, Bessemer pig iron touching its highest point, \$17.50, in September, and at the same time billets reached their climax at \$24.50, subsequently receding very rapidly. The depth of the decline was sounded in May, 1897, when Bessemer pig iron sold down to \$9.25 and billets down to \$13.75, the lowest price on record. Our market reports show that at the present time Bessemer pig iron commands \$10.55 to \$10.65 and billets are held at \$16 to \$16.50.





Trade-Mark.

Massachusetts Brand.

**SOLID BRAIDED CORDAGE.**

Sash Cord,  
Clothes Lines,  
Railroad Cords,  
Arc Light Cord,  
Lariats, Etc.



SEND FOR SAMPLES.

Awning Lines,  
Mason's Lines,  
Chalk Lines,  
Curtain Cord,  
Shade Line, Etc.



SAMSON BRAND

**SAMSON CORDAGE WORKS, - - Boston, Mass., U. S. A.**

THE  
"Easy" Bolt Clipper

**IS THE BEST.**

MANUFACTURED BY

**H. K. PORTER, 66 Beverly Street, BOSTON, Mass., U. S. A.****EVAN LEIGH & SON,**

19 James St., LIVERPOOL, England

Commission Merchants,  
Freight and Insurance Agents.

Orders promptly executed for Engines, Boiler Turbines, Roofing, Shafting, Belting  
Machinery, Card Clothing, Bobbins, Spindles, Flyers, Ring Travellers, Pickers,  
Healds, Reeds and all other Machinery Accessories, and Mill  
Supplies, Yarns, Paints, China Clay, Chemicals, Etc.

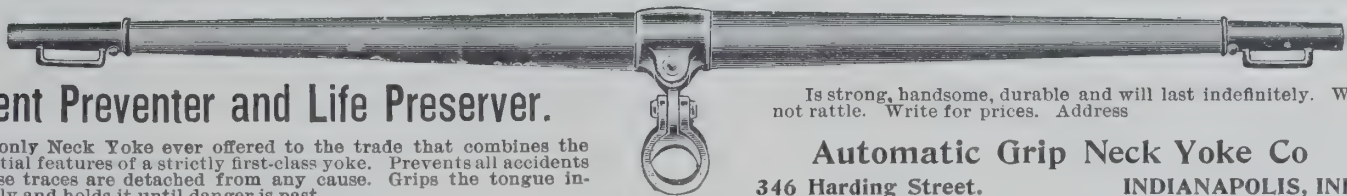
**Bi-Weekly Attendance Manchester Exchange.**

Cable Address: "LEGH LIVERPOOL."

Codes used: A 1, A B C and Unicode.

**Accident Preventer and Life Preserver.**

The only Neck Yoke ever offered to the trade that combines the  
essential features of a strictly first-class yoke. Prevents all accidents  
in case traces are detached from any cause. Grips the tongue in-  
stantly and holds it until danger is past.



Holds with an Iron Grasp

Is strong, handsome, durable and will last indefinitely. Will  
not rattle. Write for prices. Address

**Automatic Grip Neck Yoke Co**  
346 Harding Street. INDIANAPOLIS, IND.



Side View Automatic Grip Ring.



The **GRIMM**  
**Steel Range.**

The economy of fuel and the best quality of work  
can only be obtained when a range has air-tight joints.  
The mode of construction of the Grimm Steel Range  
makes air-tight joints possible without the aid of cement,  
so commonly used in mounting ranges made of cast-iron.

The joints of a properly constructed steel range  
remain indefinitely intact, and no bad results follow  
expansion and contraction.

The Grimm Steel Range is adapted to all kinds of  
fuel. It has an oven 22x22x15 inches and six 9-inch  
griddles set in an interchangeable French top. It has a  
24-inch fire-box, high and low closets and a reservoir and  
ash-pan of extremely large capacity; and all vital parts  
are protected by asbestos, thus making our Steel Range  
very durable.

We give special attention to the export trade, and  
guarantee perfect satisfaction.

**G. H. GRIMM & CO., Rutland, Vt., U. S. A.**





*Devoted to the Foreign Trade in Electrical Appliances.*

### Electric Distribution of Shop Power.

IN one of the largest industrial plants in America there are 215 electric motors in use, ranging from 2 to 50 horse-power each, with an aggregate capacity of 1930 horse-power. The total generator capacity is 700 horse-power, and the average horse-power shown at the switchboard is about 570, the load being quite steady.

The forces needed for inspection and repairs of the lines and the 215 motors, as well as 10 arc dynamos, consist of two men, with the occasional assistance of a third. One of these men works solely on armature repair. The labor cost averages about \$6 per day. The total maintenance and repair cost is, therefore, about \$2,500 per year, or about 4 per cent. on the first cost of the plant. It is estimated that this is about the same as the maintenance cost of a mechanical system of power transmission.

By the substitution of electric motors, and the consequent removal of some shafting in the shops, sufficient head room was obtained for compactly built electric cranes. This has reduced the labor involved in moving machines 50 per cent. and more, one instance being cited in which four to six men do work formerly requiring 40 and doing it more rapidly. One shop previously requiring 150 horse-power at the engine to drive the shafting alone, now seldom requires more than 80 horse-power at the switchboard, notwithstanding the addition of a crane and several new machines. Two 100-ton cranes in the erecting shop are each driven by a 50 horse-power motor, the installation effecting an immediate saving of 80 men. A number of portable electric drilling outfits are also used.

### Electric Lighting in the Chicago Peace Jubilee.

ELECTRICITY played a shining part in the national peace jubilee at Chicago during the week beginning October 16th. Of the decorations which the city put on for the occasion incandescent lights formed the most important and striking feature. By day the hundreds of miles of bunting spread over the buildings and fluttering in the streets considerably outdid the rows and festoons and pieces formed by the lamps, though even then the continued foggy weather gave a chance for many of the merchants to burn their lights through the daylight hours. But at night-time, when grimy Chicago was transformed into a bower of fairyland, the electric lamp was supreme.

Fifty thousand extra incandescent lamps, at the lowest estimate, were burned in the streets of Chicago during the peace jubilee. They made the nights in the downtown districts brighter than the foggy days. A large number of these lights, distributed evenly throughout the business centre, were put up by the jubilee committee. The rest were installed by the business houses, office buildings and individuals. Together they made Chicago, already reputed to be second only to Paris in the brilliancy of its night displays, take rank for a few days as the most gorgeously illuminated city in the world.

The lighting and decoration scheme undertaken by the jubilee committee was a novelty. So far as known to the managers, nothing like it had ever hitherto been attempted, with the exception of the recent queen's jubilee in London, where a conspicuous failure was made. The plan decided upon was the startling idea of making for the downtown districts a roof of flags by day and of light by night. The jubilee committee decided to make its roof of flags and lights by stringing rows of both at regular intervals across the streets. The flags were hung on stout ropes, six to ten on each. The lights were swung in graceful festoons from above the centre of the roadways to the buildings on either side. They formed at night the drooping curves of a tent roof, and by day harmonized well with the straighter lines of the bunting canopy. The entire downtown district, with the exception of small portions of the cross streets, was roofed in this manner. Over 3 miles of streets were decorated, and upward of 10,000 16-cp incandescent lights employed.

From 80 to 120 lights, according to the width of the street, were hung on each festoon. Four festoons were put up in each block. Forty-five feet was the average height above the street, although the arches and other decorations at times made variations necessary. Throughout the work there

was not a workman or citizen hurt, and not a mishap of any kind. Although the lights went through a week of wind and rain storms so severe that five ornamental arches were destroyed and much of the decorations ruined, yet no trouble of any consequence was reported. This fact is unquestionably due to the use of high-grade, rubber-covered wire and the best of wiring methods. In the London jubilee where the lighting failed just when most needed, ordinary weatherproof wire was used. The result, after the first heavy rain, was a succession of grounds that ruined the display. In order to avoid this trouble, the use of high-grade, rubber-covered wire everywhere was insisted on and the outcome fully justified this action.

The lights were turned on every evening at 6:30 o'clock and extinguished at 11:30 o'clock. Patrolmen did the work, walking from switchbox to switchbox, until all the festoons were reached. The system of decorative light took about 2500 amperes at 220 volts, supplied by the Edison central station. So pleased were the merchants and business men with the festoon lights that a movement was put on foot to continue the nightly illuminations of the city for thirty days more, and the project will doubtless have been carried out before this article is read. In fact, there is a strong possibility that some form of permanent lighting by festoons will be kept by the State street merchants. Next to the festoon lighting the electrical feature of the peace jubilee was the municipal arch, donated to the city by the Western Electric Company, the General Electric Company and the Chicago Edison Company. This structure was built at the corner of La Salle and Washington streets, near the City Hall. By day it proved to be the best designed and most handsomely decorated of the whole sixteen arches built for the jubilee, while at night its splendor was worth going miles to see.—*The Electrical World.*

### A Curious Safe.

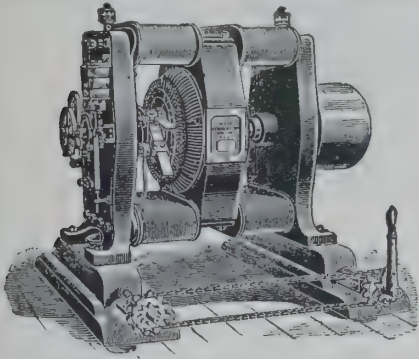
IN St. Augustine's Church, Brooklyn, N. Y., the tabernacle of the high altar is protected by probably the most novel safe ever devised. This is undoubtedly the first time in which practical science has been used as an adjunct in religious service. Of course, it was very essential that the beautiful altar itself should not be marred in any way by the safe, and that it should be operated in a dignified and fitting manner. Unfortunately, in many churches the richly jewelled receptacle for the sacrament has proved too often a bait for burglars, and many priests have tried to devise some scheme by which the security and sanctity of the tabernacle would be assured.

In the church to which we have referred the receptacle for the sacrament cost \$10,000. The safe consists of circular curving doors which slide together, closing the front toward the church. The safe weighs 1,600 pounds, and consists of four pieces, the base, a curving piece of steel at the back that is stationary, and the two doors which come together. The leaves of these doors are made of Harveyized steel an inch thick. They meet as they close under the dome, and overlap each other tightly by a scarf joint. They turn on roller bearings, and they are operated by means of an electric motor. The safe is easily opened by manipulating buttons beside the tabernacle, but these push buttons will have no effect until the motor itself is set in motion in the vault below, the combination lock of the steel vault being known only to the priests of the parish. Electrical protection is also provided which would give notice at once to the nearest police station should the safe be tampered with. Masked in its covering of gold leaf, this steel shell is a superb piece of mechanism, and it is one of the most ingenious uses to which the electric motor has ever been put. The same motor is used to drive a blower intended for the purpose of dusting the elaborately carved marble altar. An exhaust fan sucks away the dust.

**The Tonnage of Pittsburg.**—Pittsburg's tonnage for 1897, as compiled by the Chamber of Commerce, is summarized as follows: Iron, steel, ore, merchandise, 1,127,167 cars, each with a capacity of 20 tons, 22,543,340; coal, 420,000 cars, each with a capacity of 25 tons, 10,500,000; coke, 145,443 cars, capacity of 25 tons each, 3,636,075; coal shipped via the river, 4,000,000 tons; miscellaneous river shipments, 3,318,366 tons, making a grand total of 43,997,781 tons of freight originating in the Pittsburg district.

**New Shipping Regulations Regarding Puerto Rico.**—So far as it may be construed as outlining the policy of the Administration in Puerto Rico hereafter, the order issued by the Treasury Department is decidedly important. It is to the effect that trade between ports in the United States and Puerto Rico must be carried on in American vessels, and that tonnage charges shall not be levied upon such vessels, while upon all other vessels engaged in trade there will be a tonnage tax of 20 cents per net ton.





## FORT WAYNE ELECTRIC CORPORATION,

Foreign Dept.: 115 Broadway, New York, U. S. A.

Factory: Fort Wayne, Ind., U. S. A.

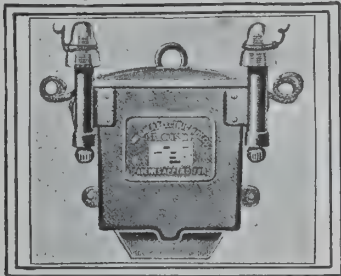
MANUFACTURERS OF

## Electric Lighting and Power Apparatus,

"WOOD" SYSTEMS

Of Arc, Direct Current and Alternating Incandescent Lighting, and Power Transmission.

Estimates furnished on receipt of specifications.



## TRANSFORMERS

NOT the CHEAPEST to Buy

BUT the CHEAPEST to Operate

We have courted and ENCOURAGED

COMPARATIVE TESTS, knowing that our Competitors alone had cause to fear them

REMEMBER, EFFICIENCY AFFECTS YOUR COAL PILE

The Cheapest Transformer is sure to prove the most expensive in the end

**WAGNER ELECTRIC MANUFACTURING CO**

GENERAL OFFICES AND FACTORY, ST. LOUIS, U.S.A.

WHEN WRITING US MENTION "THE AMERICAN EXPORTER."

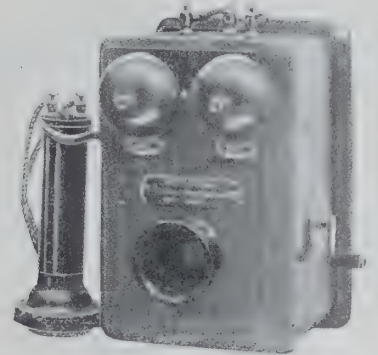
## Western Telephone Construction Co.,

250 SOUTH CLINTON ST., CHICAGO, ILL.,

U. S. A.

Largest Manufacturers in the  
United States EXCLUSIVELY of

## TELEPHONE APPARATUS.

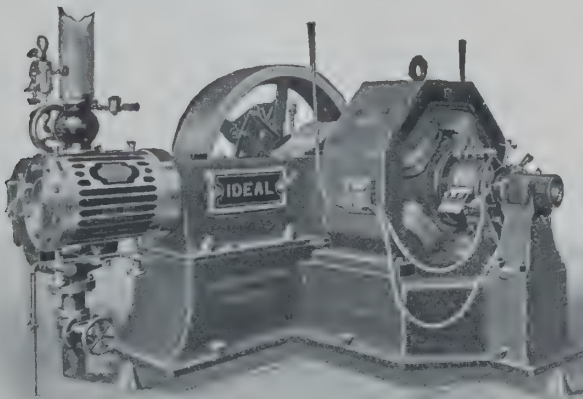
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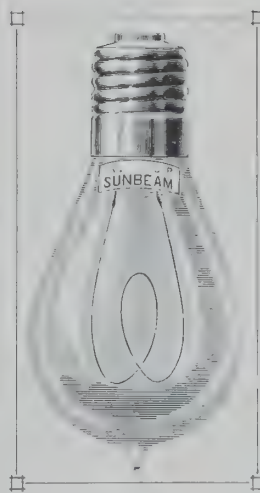
Electric Light, Heat and Power Machinery,

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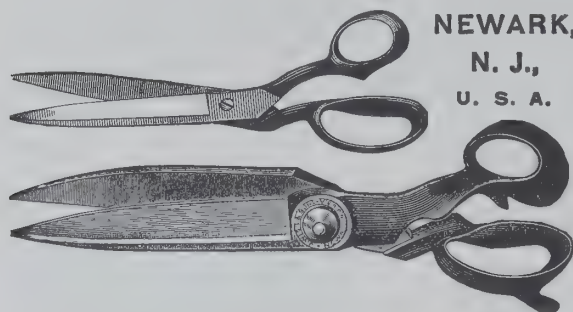


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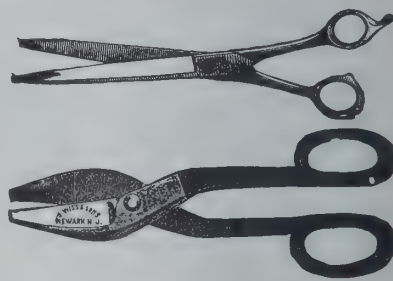
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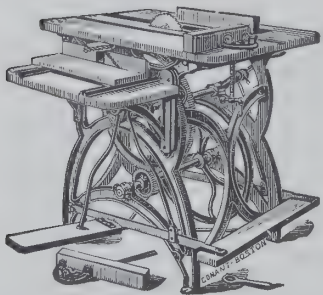
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A complete line of Accessories for Cotton Machinery, Etc.,  
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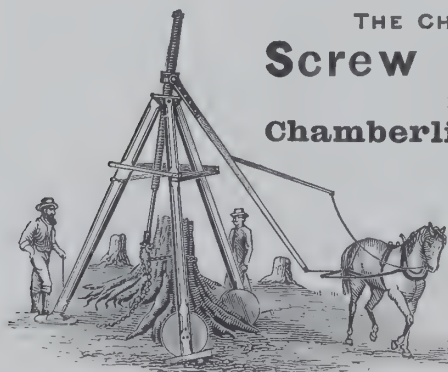


Weights 300 pounds. Gauges slide  
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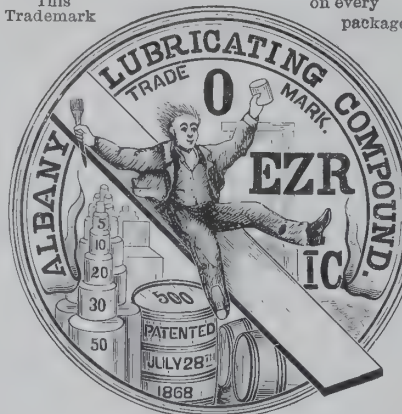
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him we doubted if grease would keep the journals cool, and we are still of the  
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Yours truly,

EYSTER & SON.

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GENTLEMEN—We have given your grease a thorough test. Send on the  
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EYSTER & SON.

High Pressure

**Bicycle Sundries.**

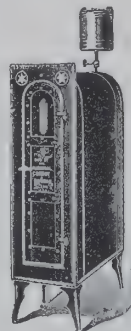
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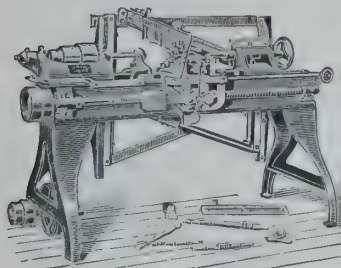
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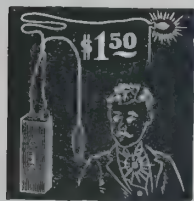
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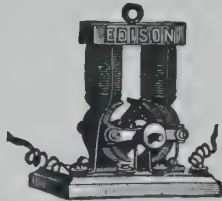


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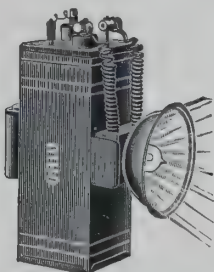
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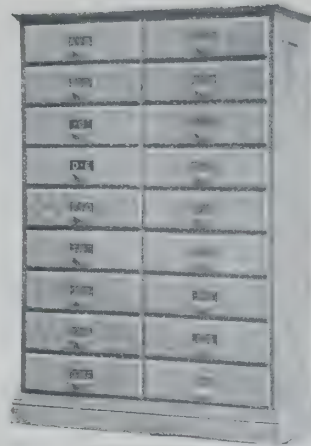
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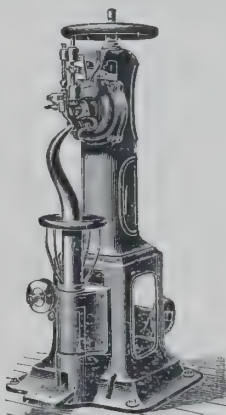
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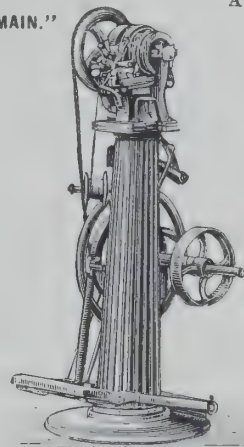
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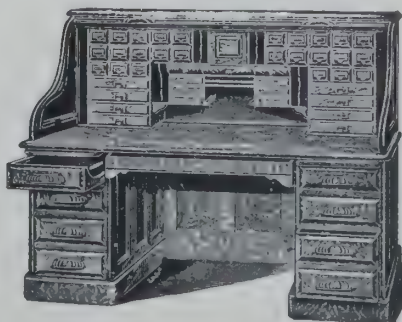
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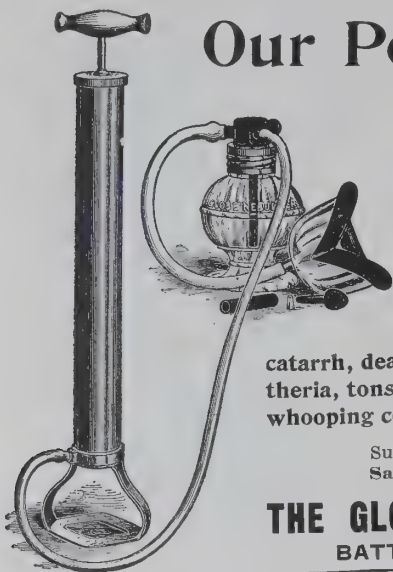
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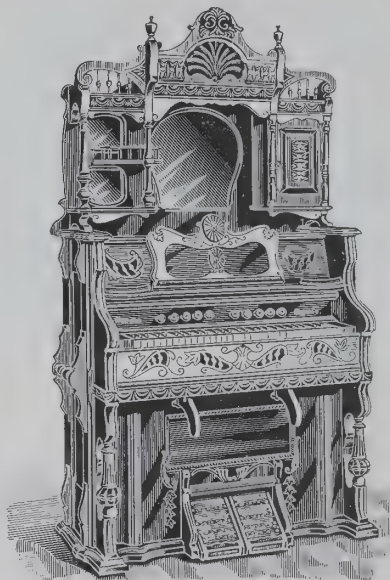
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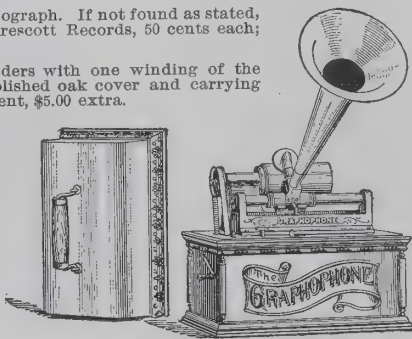
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**BEST ROLLING LADDERS**

in every respect in the world.

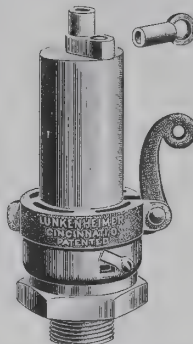
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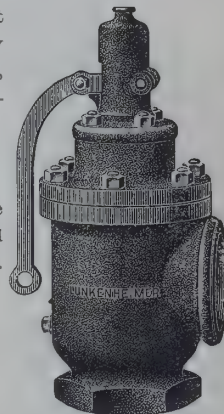


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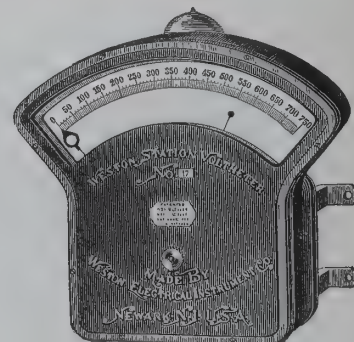
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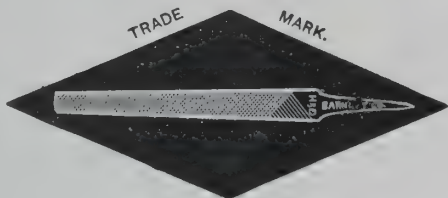
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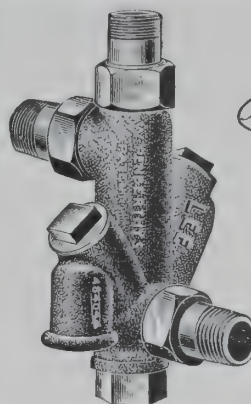
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**ALSO YACHTS AND LAUNCHES fully adapted for tropical countries.**

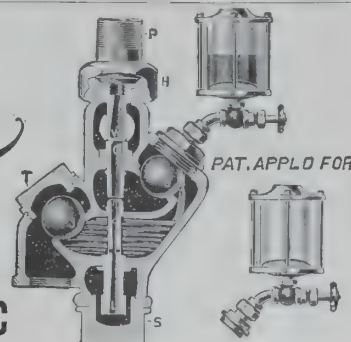
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This is an extra fine Lamp, made in three sizes, has no chimney,  
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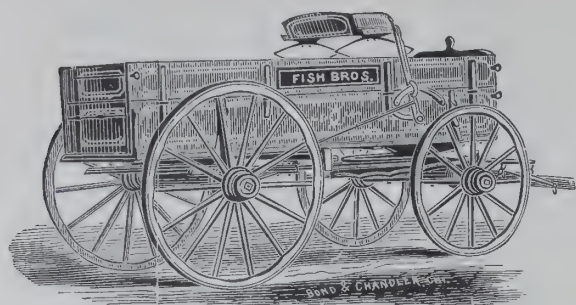
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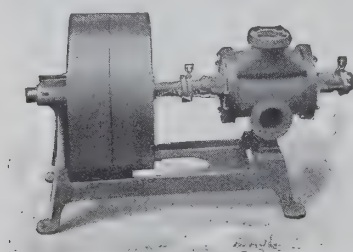
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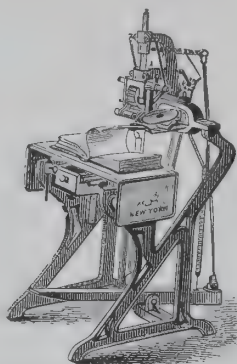
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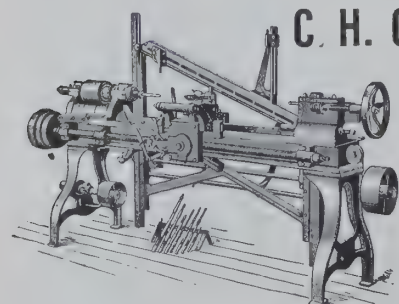


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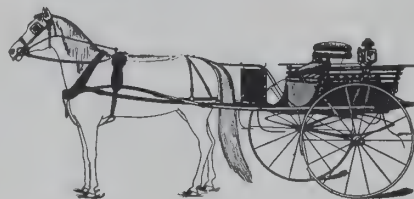
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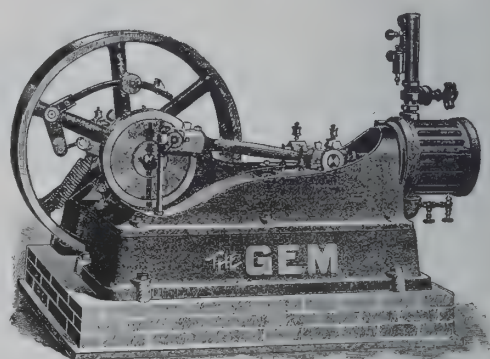
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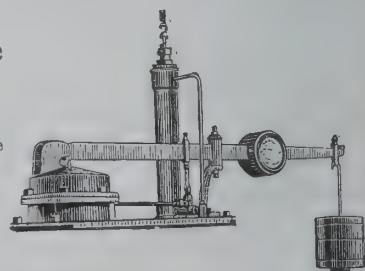
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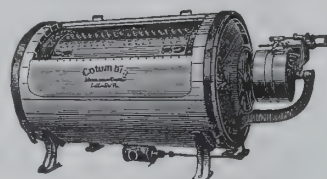


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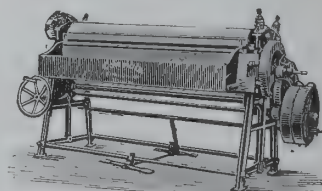
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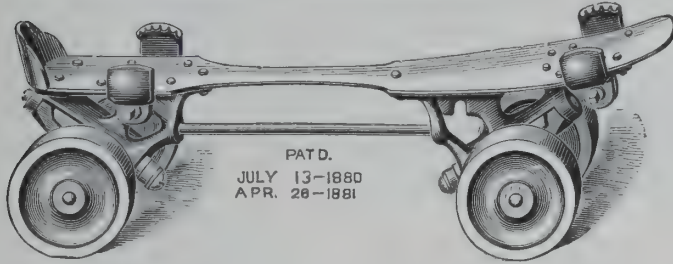


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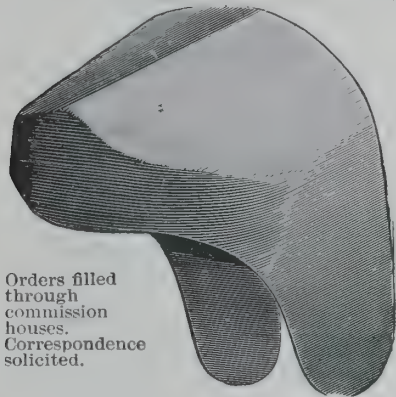
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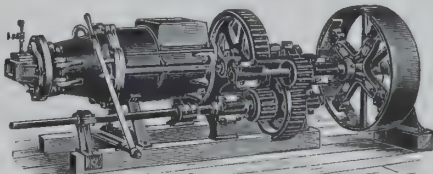
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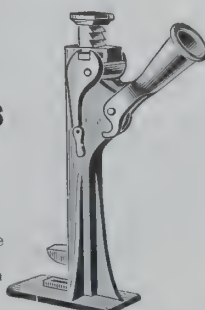


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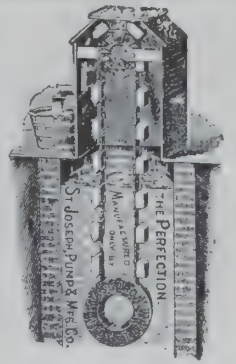
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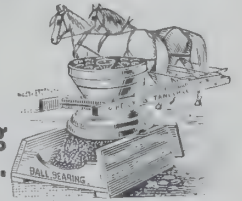
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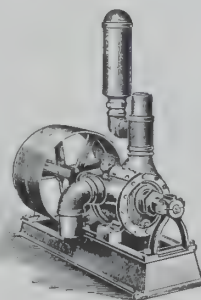


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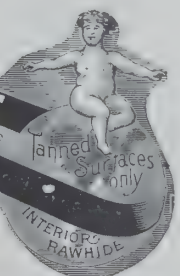
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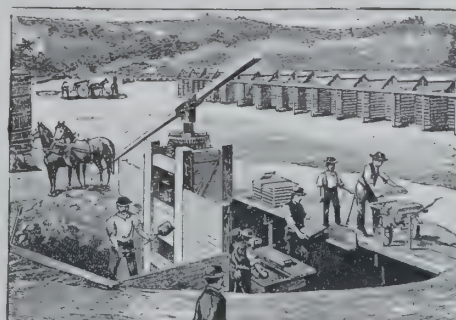
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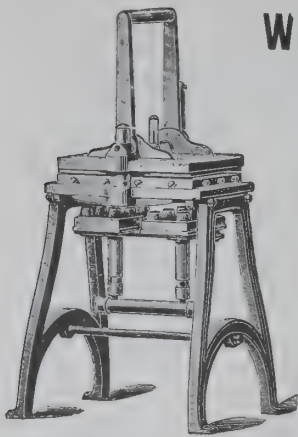
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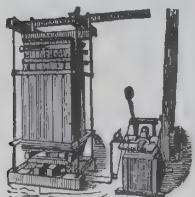
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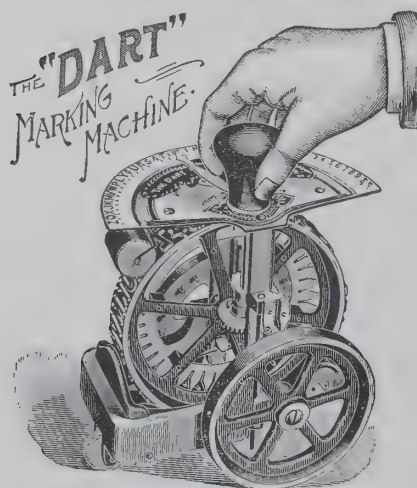
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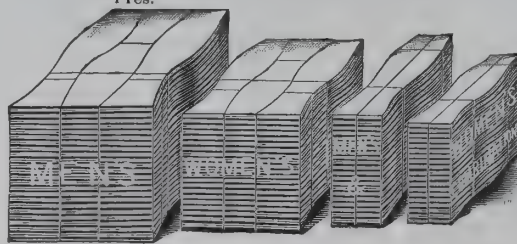
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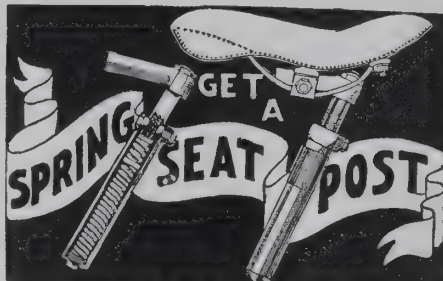
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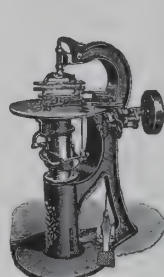
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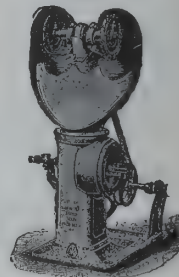
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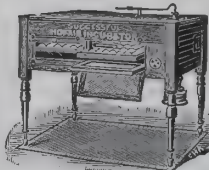
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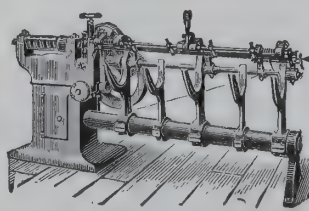
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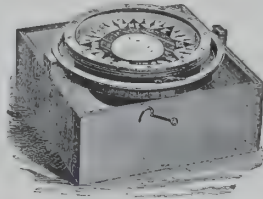
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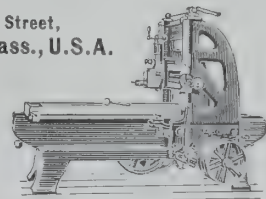
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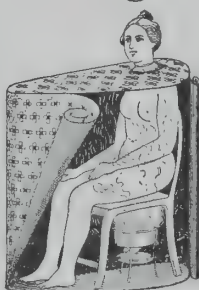
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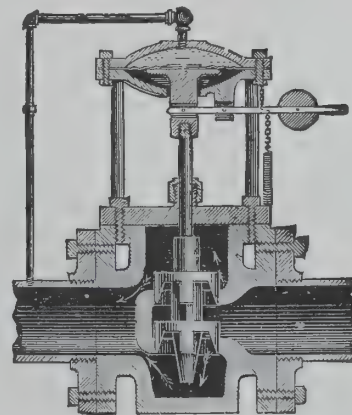


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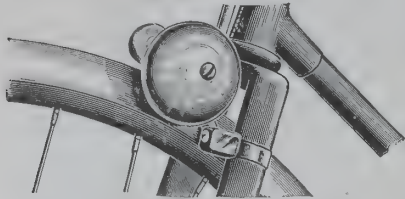
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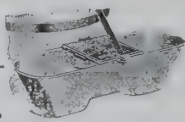
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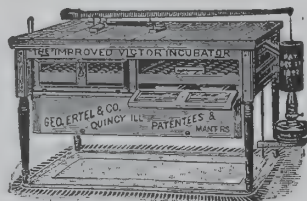
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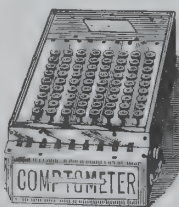


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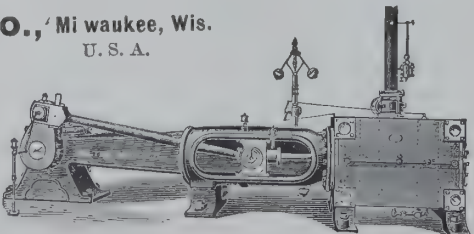
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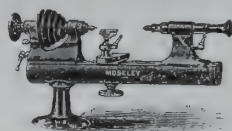
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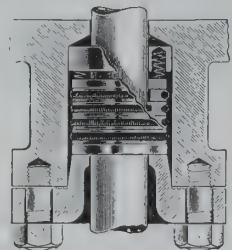
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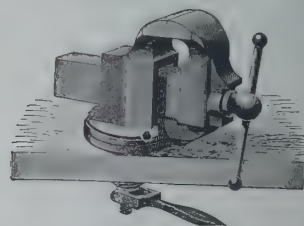
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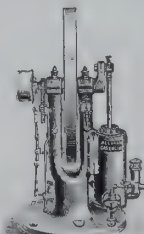
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